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SCIENCE AND TECHNOLOGY

No. 55

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NATIONAL DEVELOPMENTS

BRIEFS

QINGHAI TOPONYMY CONFERENCE--The Qinghai Provincial Toponymy Work Conference concluded 8 August. The conference summed up past experience in carrying out this work and discussed the State Council's tentative regulations on renaming some administrative divisions in the country. The conference revealed that Qinghai Province now has surveyed and renamed some 10,000 locales. With the help of the State Bureau of Surveying and Cartography, the Qinghai Provincial Surveying and Cartography Bureau recently published a book on the toponymy of Qinghai Province based on the results of the general survey. [Sining Qinghai Provincial Service in Mandarin 1100 GMT 12 Aug 80 SK]

SHANDONG PLACE NAMES CONFERENCE--The Second Shandong Provincial Place Names Conference was held in Jinan recently. Deputy Governor Song Yimin attended the conference and spoke. The conference summarized previous work in this regard and decided to grasp well the following work: 1) Sincerely studying and implementing the provisional regulations concerning the adoption and changing of place names adopted by the State Council and doing a good job of standardizing place names; and 2) continuing to carry out general survey on place names and paying attention to verifying place names through textual research. Following the conference the provincial leading group for adoption and changing of place names convened the conference to discuss issues concerning the establishment of a provincial place name society. [Jinan Shandong Provincial Service in Mandarin 2300 GMT 20 Jun 80 SK]

HUBEI PLACE NAME CONFERENCE--The First Hubei Conference on Place Names ended on 8 June. The participants pledged to basically fulfill investigations of place names throughout the province this year so as to standardize all the place names. In the first half of next year, the municipalities and counties must compose and publish place names in their areas. The participants also studied the problems existing in place names. They pointed out that the problems of organization in some counties and districts have not been solved and the development of place names is uneven. The participants made preliminary plans on work from 1985 to 1989 and will compose and publish the place names in Hubei before 1985. Therefore, the party committees in the prefectures, municipalities, counties and districts must effectively strengthen their leadership over place name work. [Wuhan Hubei Provincial Service in Mandarin 1100 GMT 8 Jun 80 HK]

LIAONING PLACE NAMES SURVEY--Liaoning Province has scored some initial achievements in the general survey of place names following a year's efforts. Lua, Benxi, Jinzhou and Dandong and 32 other counties and districts have completed on-the-spot investigations. [SK132156 Shenyang Liaoning Provincial Service in Mandarin 1100 GMT 11 Jul 80 SK]

HEILONGJIANG PLACE NAME WORK CONFERENCE--The Heilongjiang Provincial Place Name Work Conference concluded on 23 July. The conference decided to continue the place name pilot survey work in the province and strive to finish the work next year. The conference also called on the people's governments at all levels to strengthen leadership over this work, follow the mass line, publicize the significance and urgency of the place name work extensively and thoroughly, and make due contributions to providing accurate place name information and accomplishing the standardization of place names in Heilongjiang Province. Lu Guang, deputy governor of the Heilongjiang Provincial People's Government, attended and addressed the conference. [SK280400 Harbin Heilongjiang Provincial Service in Mandarin 1100 GMT 23 Jul 80 SK]

JIANGSU LAKES GAZETTEER--Nanjing, 8 Aug--The Nanjing Geographic Research Institute of the Chinese Academy of Sciences has completed the compilation of "Gazetteer of Lakes of Jiangsu." This 250,000-word volume is the first special scientific reference book in China on lakes. It deals with the formation, changes, aquatic resources hydrographic data of more than 110 fresh water lakes in Jiangsu of over 1 square kilometer in size. Work to compile the Gazetteer began in 1958 under the leadership of Professor Shi Chengxi of the Huadong Water Conservancy College, a vice president of the China Oceanography and Limnology Society. [OW081315 Beijing XINHUA Domestic Service in Chinese 0155 GMT 8 Aug 80 OW]

CSO: 4008

APPLIED SCIENCES

SUCCESSSES OF CHINESE ELECTRONICS INSTITUTE DESCRIBED

Beijing GUANGMING RIBAO in Chinese 15 Jul 80 p 2

[Article: "Great Successes Scored by the Electronics Institute, Chinese Academy of Sciences"]

[Text] In 1979 the Electronics Institute, Chinese Academy of Sciences, achieved great scientific successes, and made an important contribution to the country. A review indicates that some programs have attained the 1970's worldwide state of the art, others have filled in national gaps, and many have received awards for scientific achievement from the National Defense Committee.



A color television camera tube is the key component of color television broadcasting and is technologically very difficult. After several years' research and experimental fabrication, the institute has made considerable advances in resolution, sensitivity, optoelectronic conversion characteristics and inertia.

The photograph shows scientific and technical workers conducting an experiment with a target surface process.



A free electron circulating pulse ring [1049] is a new device which can produce high-power coherent electromagnetic radiation in the millimeter and submillimeter regions. In this work, the institute has already achieved satisfactory experimental results in the 8-millimeter region.

The photograph shows a scientist taking measurements.



The main technical characteristics of the low-power argon ion laser developed by the institute are at the international state of the art, and it has found broad application in spectrography, ophthalmology, underwater laser television, and information storage.

The photograph shows a scientist adjusting the device.

8480

CSO: 4008

CHINESE, WEST GERMANS DEVELOP NEW CHARACTER TYPEWRITER

Shanghai JIEFANG RIBAO in Chinese 14 Jul 80 p 1

[Text] An automatic Chinese character typewriter developed jointly by Chinese and West German scientists and technicians was exhibited again recently in Shanghai. During the 6-day exhibition which ran from the 7th through the 12th, concerned cadres, scientists and technicians observed operational demonstrations of a prototype with great interest. Everyone was elated at the major improvement that this represents for Chinese character typing and communications.

Figuring out how to input and store Chinese characters in a computer has been the object of competitive research by the scientists of many countries for some years. The Chinese character encoding method known as the "character recognition code" developed by 10 years of research by Zhi Bingyi [2388 4426 1744], Chief Engineer at the Shanghai Instruments and Meters Institute, represents a rather scientific way of inputting Chinese characters into a computer. Beginning last year, Zhi Bingyi and the West German Olympia Company cooperated in developing an automatic Chinese character typewriter employing both the "character recognition code" and a new ink-jet printing method, and eventually achieved gratifying results. Last November a prototype of this typewriter was exhibited successively in Shanghai and Beijing, arousing considerable interest. Subsequently, through the hard work of scientists and technicians of both countries, there were further breakthroughs in long-distance transmissions and in improving the various capabilities of the prototype.

In the exhibition room, the typist sits in front of a prototype about the same size as a standard Chinese typewriter and, not looking at the keyboard, uses both hands to type the "codes" on the keys expertly. At this time, clear, well-formed characters appear on the white paper line after line. Not only is this done quickly, it is also noiseless. This particular typist can blindtype from 60 to 79 characters per minute. The typewriter is equipped with a microprocessor, which gives it revising and editing capabilities. It can also serve as an input terminal for a computer. This new apparatus can be used for telegraphic transmission of Chinese characters, and can also use the telegraphic codes in current use for inputting. Hence, it can gradually replace teleprinters which do not

have automatic message-recognition capabilities. In addition, the apparatus has widespread applications in the various realms of character information processing.

This automatic character typewriter has tremendous significance with regard to the speedy development of the use of computers to carry out character information processing. Scientists and technicians of China and West Germany will continue to cooperate to achieve further improvements on the present foundation.

CSO: 4008

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

COSMIC RAY, HIGH ENERGY ASTROPHYSICS CONFERENCE HELD IN QINGDAO

Beijing GUANGMING RIBAO in Chinese 16 Aug 80 p 2

[Article: "All-China Conference on Cosmic Ray and High Energy Astrophysics Held in Qingdao"]

[Text] An all-China conference on cosmic ray and high energy astrophysics was held in the city of Qingdao from 5-10 August. Nearly 100 scientists and technicians from 32 units attended the conference. Eight special reports were heard and 100 papers received. These papers and reports reflect China's recent progress in research on cosmic ray high energy physics, cosmic ray and space physics, and high energy astrophysics and report on current international research activities in these fields as well as probe the possibilities of Chinese breakthroughs in certain new areas of research.

Scientists at the conference enthusiastically pointed out that in recent years China's research work in these sciences has shown encouraging progress. The Ganbala Mountain emulsion lab in Xizang is constantly being expanded and has already begun to collect data on high energy application, achieving some noteworthy results. Initial engineering work has been basically completed on scientific experiment balloons, which are now in the practical stage. Tangible gains have been made in the trial production of satellite measurement instruments for X-rays, gamma rays and charged particles, the application of high energy astrophysics to pulsar and neutron star research is now being explored, and worthwhile theoretical models dealing with gamma ray and X-ray bursts have been produced.

CSO: 4 3

AUTHOR: LO Junjie [5012 0193 2638]

ORG: None

TITLE: "Decoy Missiles"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 6, Jun 80 pp 6-7

ABSTRACT: Decoy missiles are used by the U.S. Air Force to improve the effectiveness of a missile offensive mission. The main functions of decoy missiles are to: 1) deceive the enemy defense system with false targets; 2) create radio frequency interference for enemy radars; and 3) directly attack enemy targets. Currently, the United States have developed two decoy missiles: the "Quail" missile, which is an airplane shaped fiberglass missile with a maximum range of 639 km; and the subsonic cruise decoy missile with a maximum range of 1600 km. To accomplish its mission, the decoy missile is equipped with many electronic counter measure devices such as radar reflection modulator, jamming devices, and deceptive interference generator.

AUTHOR: WU Zonglan [0702 1350 3663]

ORG: None

TITLE: "Infrared Microscope and Space Electronic Equipment"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in Chinese No 6, Jun 80 pp 8-9

ABSTRACT: The infrared microscope is an instrument which can be used to examine the detailed structure of complicated electronic components used in space vehicles. It plays an important role in ensuring the reliability of electronic equipment and the successful operation of the spacecraft. In this article, the main advantages of using infrared microscope to inspect electronic components are pointed out. The basic structures of the fixed-pointing infrared microscope and the scanning infrared microscope are described. In addition, other applications of the infrared microscope such as inspection of alloys, measurement of thermal characteristics of high energy laser components, etc., are also discussed.

AUTHOR: WANG Chengduo (3769 2052 1122)
HAN Shumin (7281 2885 2494)
LI Shutang (2621 2885 1016)

ORG: None

TITLE: "Electronic Computers and Aviation"

SOURCE: Beijing HANGKONG ZHISHI (AERONAUTICAL KNOWLEDGE) in
Chinese No 6, Jun 80 pp 10-11

ABSTRACT: Electronic computers are used in almost every aspect of modern aviation. In this article, the following applications of electronic computers are discussed: 1) fire control systems on fighter airplanes; 2) navigation systems; 3) anti-submarine warfare; 4) unpiloted high altitude reconnaissance airplanes; 5) electronic counter measures and digital communication; 6) air-borne command systems, air traffic control systems, and airport ground control systems; and 7) physical modeling and system simulation.

AUTHOR: WU Liyao (0702 7642 6460)
ZHANG Taichang (1728 1132 2490)

ORG: None

TITLE: "Survival at Sea"

SOURCE: Beijing HANGKONG ZHISHI (AERONAUTICAL KNOWLEDGE) in
Chinese No 6, Jun 80 pp 12-13

ABSTRACT: This article discusses how a pilot can improve his chance of survival at sea in case he is forced down over water. Specifically, the following survival techniques are introduced: 1) keeping afloat on water by using life boats and life jackets; 2) maintaining energy level by making drinking water from sea water or rain; 3) calling for help during day time by using radios, reflective dyes, smoke tubes, and mirrors; and 4) establishing contact during night time by using smoke tubes and flash signals.

AUTHORS: LIU Bin (0491 6333)
LI Shuzu (2621 6615 4371)

ORG: None

TITLE: "Test Platform for Aircraft Engines"

SOURCE: Beijing HANGKONG ZHISHI (AERONAUTICAL KNOWLEDGE) in Chinese No 6, Jun 80 pp 14-15

ABSTRACT: Recently, a new test platform was completed and certified by the Chinese Government for testing new aircraft engines. In this article, an introductory description of engine test platform is presented. The description includes: 1) the overall layout of an engine test platform; 2) the testing module, which includes the air intake system, the exhaust system, and the control and instrumentation room; 3) the test facilities, which include the platform structure and force measuring system, the various supply systems, the sensing and control system, the fire extinguishing system and safety equipment, and the sound suppression system.

AUTHOR: PEI Kai (2431 0418)

ORG: None

TITLE: "Agriculture and Aviation"

SOURCE: Beijing HANGKONG ZHISHI (AERONAUTICAL KNOWLEDGE) in Chinese No 6, Jun 80 p 17

ABSTRACT: During a technical exchange conference which took place in January at the Chenxi Lake Farm, the topic of using airplanes to facilitate agricultural activities in China was discussed. The discussion centered on the following issues: 1) the classification of airplane as a farm machine; 2) the necessity of using airplanes in large scale farming operations or time-critical operations; and 3) the relative low cost of airplane farming in comparison with manual labor or ground farm machines.

AUTHOR: YUAN Junlin (5913 0193 2651)

ORG: None

TITLE: "The Future of Small Civil Airplanes"

SOURCE: Beijing HANGKONG ZHISHI (AERONAUTICAL KNOWLEDGE) in Chinese No 6, Jun 80 pp 18-19

ABSTRACT: The demand for small civil airplanes has been increasing rapidly because of its versatility and the increasing fuel cost. Currently, many new technologies and new materials are being used on small civil airplanes such as composite resin graphite materials, single crystal metallic alloys, supercritical wing designs, and automatic fault detection systems. In this article, a number of possible future designs of small civil airplanes are introduced. They include: single and twin engine turbo-prop airplanes with rear-mounted propellers; jet-propelled airplanes with canard wings; and vertical take-off airplanes with combination rotary and fixed wing designs.

AUTHOR: None

ORG: None

TITLE: "Flying Toward the Pacific"

SOURCE: Beijing HANGKONG ZHISHI (AERONAUTICAL KNOWLEDGE) in Chinese No 7, Jul 80 p 3

ABSTRACT: As a reporter of the Xinhua Press, the author witnessed the launch of a Chinese carrier rocket from a certain launch site on the mainland toward the Pacific Ocean. In this article, he described the various aspects of the launch: rocket ignition; vertical ascent and pitch over; tracking of the rocket during its mid-course; display of the rocket trajectory; monitoring the rocket from re-entry to impact; and retrieval of the instrument container from the ocean.

AUTHOR: *U Yongshu (0702 3057 3219)

ORG: None

TITLE: "Full Range Flight Testing of Carrier Rockets"

SOURCE: Beijing HANGKONG ZHISHI (AERONAUTICAL KNOWLEDGE) in Chinese No 7, Jul 80 pp 3-5

ABSTRACT: This article presents a tutorial discussion of the basic problems involved in the flight tests of carrier rockets. Specifically, the following issues are addressed: 1) the necessity of performing flight tests to verify the operational reliability of the power plant, the control system, and the rocket structure of the carrier rocket; 2) the organization of flight test which involves selecting the flight course and impact region, and establishing a communication and instrumentation network; 3) the construction of launch facilities and monitoring stations along the missile flight path; and 4) the operation of various measuring instruments and remote sensors for tracking the missile and monitoring the rocket performance parameters.

AUTHOR: HAN Wenmin [7281 2429 2494]

ORG: None

TITLE: "Weather Satellites"

SOURCE: Beijing HANGKONG ZHISHI (AERONAUTICAL KNOWLEDGE) in Chinese No 7, Jul 80 pp 6-7

ABSTRACT: Because of their unique vantage points in space, weather satellites can provide global coverage of the earth's atmosphere to obtain important weather data such as temperature, humidity, wind velocity and direction. Since the early 1960's, approximately 130 weather satellites have been launched. On most weather satellites, meteorological measurements are taken using remote sensors in the visible, infrared, and microwave frequency ranges. In general, weather satellites are placed in one of the following types of orbits: polar orbit, sun-synchronous orbit, or earth-synchronous orbit.

AUTHOR: QI Deng [7871 4098]

ORG: None

TITLE: "Separation of Satellite from the Carrier Rocket"

SOURCE: Beijing HANGKONG ZHISHI (AERONAUTICAL KNOWLEDGE) in Chinese No 7, Jul 80 pp 12-13

ABSTRACT: The proper separation of a satellite from its carrier rocket is a crucial step in placing the satellite in its pre-determined orbit. In this article, some key issues of the separation process are discussed. Specifically, the importance of fixing the satellite attitude before separation is pointed out. Two different types of separation systems: the ejection system and the speed reduction system are introduced. The problems of avoiding contamination of the satellite by the engine exhaust and collision with the solid rocket engine are also discussed. In conclusion, the technique of separating multiple satellites from a single carrier rocket is briefly described.

AUTHOR: YANG Huiqin (2799 1920 3830)

ORG: None

TITLE: "The RH-53 Mine-Sweep Helicopter and the H-53 Helicopter"

SOURCE: Beijing HANGKONG ZHISHI (AERONAUTICAL KNOWLEDGE) in Chinese No 7, Jul 80 pp 17-18

ABSTRACT: The RH-53 mine-sweep helicopter belongs to the H-53 helicopter series built by the Sikorsky Company. Other models in the series include: 1) the CH-53A, which is a strike and transport helicopter built for the U.S. Marine; 2) the HH-53B, which is a rescue and retrieval helicopter built for the U.S. Air Force; 3) the HH-53C, which is a modified version of HH-53B with two 3925 hp engines; 4) the CH-53D, which is a modified version of CH-53A with larger engines; and 5) the RH-53A and RH-53D helicopters. The important technical data of the H-53 helicopters are as follows: maximum take-off weight--22680 kg; cruising speed (CH-53D)--278 km/hr; maximum climb rate (CH-53D)--664 m/min; Practical ceiling (CH-53D)--6400 m; maximum range (CH-53D)--413 km.

AUTHORS: SHI Xiaohua (0670 2556 5478)
CAI Lujiang (5591 7120 3068)

ORG: None

TITLE: "The C-130 Mid-Size Tactical Transport Airplane"

SOURCE: Beijing HANGKONG ZHISHI (AERONAUTICAL KNOWLEDGE) in Chinese No 7, Jul 80 p 18

ABSTRACT: The C-130 is a military transport airplane powered by four turbo-prop engines. It was developed by the Lockheed Airplane Company for the U.S. Air Force and the U.S. Army. Since December 1956, a total of more than 1500 C-130 airplanes have been delivered. The main technical parameters of the C-130 are as follows: cruising speed--547 km/hr; maximum range--7600 km; wing span--40.41 m; length--29.78 m; height--11.66 m.

AUTHOR: LI Zhifeng [2621 0013 2646]

ORG: None

TITLE: "The Soviet Heavy Fighter Bomber--SU-19"

SOURCE: Beijing HANGKONG ZHISHI (AERONAUTICAL KNOWLEDGE) in Chinese No 7, Jul 80 pp 19-20

ABSTRACT: The SU-19 is a Soviet fighter bomber designed specially for air-to-ground offensive missions. It has a variable-sweep wing design whose sweep angle varies between 16° and 70°. It has a narrow fuselage which measures 21.77 m in length and is powered by two AL-29 turbo-jet engines with a thrust level of 8300 kg. It is capable of carrying 4500 to 6500 kg of bombs and missiles. It has a maximum speed of Mach 2.35 and a long range cruising speed of Mach 0.75. Its combat radius is 1300 km which is large enough to reach most European cities. Its empty weight is 18000 kg and its maximum take-off weight is 33500 kg.

AUTHOR: TANG Xiangbi [0781 4161 4310]

ORG: None

TITLE: "Variable Cycle Engine"

SOURCE: Beijing HANGKONG ZHISHI (AERONAUTICAL KNOWLEDGE) in Chinese No 7, Jul 80 pp 25-27

ABSTRACT: The variable cycle engine is a new engine design whose thermodynamic parameters can be controlled to accommodate both supersonic and subsonic flight conditions. Its basic structure consists of a variable-geometry fan, a variable-geometry compressor, a main combustion chamber, and an auxiliary combustion chamber located in the outer channel, a turbine, as well as ejectors and concentric nozzles. In this article, the operation of a variable cycle engine under take-off conditions, supersonic cruise conditions, and subsonic cruise conditions are illustrated.

AUTHOR: None

ORG: None

TITLE: "New Fighter Airplanes of the 21st Century"

SOURCE: Beijing HANGKONG ZHISHI (AERONAUTICAL KNOWLEDGE) in Chinese No 7, Jul 80 p 31

ABSTRACT: This article introduces several new designs of future fighter airplanes. They include: 1) a high altitude Navy fighter airplane with a speed of Mach 3; 2) a high altitude supersonic airplane incorporating advanced technology; 3) a high speed, twin-fuselage fighter airplane; 4) a fighter airplane made of advanced materials; 5) a fighter airplane with front sweep wing designs and canards; and 6) a multiple purpose vertical and short take-off airplane.

AUTHORS: QU Guangji [2575 1684 0679]
YU Minsheng [0151 2494 3932]
ZAO Zhengcai [6392 2973 2088]

ORG: None

TITLE: None

SOURCE: Beijing HANGKONG ZHISHI (AERONAUTICAL KNOWLEDGE) in Chinese No 7, Jul 80 pp 32-34

ABSTRACT: In 1973, the United States initiated an effort to develop a global positioning system to meet the increasing demands of military and civilian navigation. The system will consist of a network of 24 navigation satellites in three different orbits as well as ground control stations and user receiving equipment. By receiving transmitted signals from three or more satellites of the global positioning system, the positions of ships, airplanes, land vehicles, and inter-continental missiles can be accurately determined. When completed in the mid-1980's, the global positioning system will find a wide range of applications such as traffic control, oceanic survey, military coordination, and missile guidance, etc.

AUTHOR: XIEH Chu [6200 2806]

ORG: None

TITLE: "The American Hostage Rescue Operation"

SOURCE: Beijing HANGKONG ZHISHI [AERONAUTICAL KNOWLEDGE] in
Chinese No 7, Jul 80 pp 42-45

ABSTRACT: On 24 April of this year, an attempt was made by a special task force of the United States to rescue American hostages who are being held by the Iranian government in Tehran. The rescue operation involved six C-130 military transport planes and eight RH-53 helicopters. In this article, a detailed account of the operation is reported. It includes a fictional description of the rescue plan, the difficulties encountered by the helicopters, the decision to abandon the operation, and the tragic collision between a RH-53 helicopter and a C-130 airplane.

3012
CSO: 4009

Geography

AUTHOR: CAI Zongxia [5591 1350 1115]

ORG: None

TITLE: "An Inspection Tour of Tengchong"

SOURCE: Beijing DILI ZHISHI [GEOGRAPHICAL KNOWLEDGE] in Chinese No 7, Jul 80
pp 1-3

ABSTRACT: Tengchong County is located in the western part of Yunnan Province, bordering Burma. In 1978, the author and colleagues came to this region to participate in a remote sensing experiment for surveying the vegetative cover. The experiment lasted more than 2 months. This paper describes the trip in 3 sections. In the first section, the topography of Tengchong, being south and southwestern extensions of the Hengduan Mountains, with Gaoligong Shan as its major range, is described. The second section is devoted to the famous and strange scenes of volcanos and volcanic craters. Many gas springs and hot springs were observed. The third section describes the area's subtropical broadleaf evergreens, covering practically all the mountainous areas between 1800m-3000m. Pine forests and tall shrubs appear at about 2600 m to above 3000m. The difference of elevation causes the climate to be different. The difference of 10 li is like a difference of 1000 li from the south to the north. The topography influences the climate, which acts upon the vegetation to form a distribution of vertical zones.

AUTHOR: WANG Xiafei [3769 7209 2431]

ORG: None

TITLE: "Effect of Topography on the Climate of Yunnan"

SOURCE: Beijing DILI ZHISHI [GEOGRAPHICAL KNOWLEDGE] in Chinese No 7, Jul 80
pp 4-5

ABSTRACT: Generally speaking, in Yunnan plateau "all 3 seasons are like spring; under the bright sunlight it is always summer; whenever it is slightly cloudy it is the autumn; the winter comes with every rain." Topographically, it is higher in the north and lower in the south to divide the province into the 3 zones of cold, temperate, and tropical according to the elevation. The direction of the mountain ranges and streams determines the direction and speed of air currents to cause the climate of the eastern and western parts of the province to be different also. Although the province is an inland plateau, it is not very far from the sea to cause its about 1100mm of annual precipitation to be concentrated in the period of May-October (85 percent) while the difference in precipitation between the windward and the leeward slopes may be 3 fold. These and other climatic characteristics of Yunnan Province are described.

AUTHOR: LIU Yunan [0001 7183 3948]

ORG: None

TITLE: "The Ancient City, Zhenjiang"

SOURCE: Beijing DILI ZHISHI [GEOGRAPHICAL KNOWLEDGE] in Chinese No 7, Jul 80
pp 6-7

ABSTRACT: The city of Zhenjiang is located on the southern bank of the Yangzi River in the middle of Jiangsu Province. It faces the water on one side, and on the remaining 3 sides, it is surrounded by mountains. Originally, as Zhu-fang in Zhou Dynasty, Dantu in Qin Dynasty, or Jingkou during the period of the Three Kingdoms, it is an important ford of Yangzi crossing. From Sui and Tang Dynasties to 1858, it was a harbor and center of transportation for silk, tea, and grains of the Taihu Lake region. Its importance was only next to Suzhou. From 1858 to 1911, the city's economy prospered with the rising importance of Yangzi in merchandise transport. From 1912 to 1949, the completion of railways from the south to the north caused commercial transport to be shifted to Nanjing and Shanghai and the city to lose its ancient function. Since the liberation, the reconstruction of the Grand Canal and the city's railway station and the newly constructed 10,000 ton deep water docks have helped the city to become an auxiliary harbor for Shanghai to meet the needs of international trade. Various projects in the city have also brought back its scenic past to make it one of the tourist attractions.

AUTHOR: WANG Yiming [3076 0001 7686]

ORG: None

TITLE: "Yinchuan Plain and Ningxia Plain"

SOURCE: Beijing DILI ZHISHI [GEOGRAPHICAL KNOWLEDGE] in Chinese No 7, Jul 80
p 7

ABSTRACT: A narrow and long Huanghe alluvial plain, called the Ningxia Plain is distributed to the east of the Helanshan Mountain Range and the west of the Qarduosi Plateau. The Ningxia Plain is divided into 2 topographical units by the Qingtong Gorge. To the south of the gorge, the plain is 120 km in length with a varying width of 2-10 km and is called Weining Plain. To the north, it is 170 km in length, with a varying width of 10-40 km and is called the Yinchuan Plain. This nomenclature has never become a problem until the recent years. Some are calling the Ningxia Plain the Yinchuan Plain or Yinzhong Plain, and changing the name of the plain to the north of the gorge into Yinwu Plain, etc. The author objects to these. He thinks that these names are contrary to the traditional principle of nomenclature. He states the reasons for his objection in the paper.

AUTHOR: MOU Puduo [0719 6010 1122]

ORG: None

TITLE: "Preliminary Exploration of Xianlingdong"

SOURCE: Beijing DILI ZHISHI [GEOGRAPHICAL KNOWLEDGE] in Chinese No 7, Jul 80
pp 8-10

ABSTRACT: In the process of traveling through the region of Hangzhou to survey its tourist resources, the author and colleagues discovered in Tonglu County, a large limestone cavern, Xianlingdong. For the purpose of assessing the value of developing it into a tourist attraction and the condition of its construction, a preliminary scientific surveying trip was carried out. On the road, the group debated among themselves enthusiastically the problems relating to planning and constructing a scenic route from Hangzhou to Fuchunjiang to Xinanjiang for the tourist trade to cause everyone to be unaware of the 120 km distance from Hangzhou to Xianlingdong. Scenes of the limestone cavern are described. Maps are given to depict the locations of its various parts.

AUTHOR: None

ORG: The Secretariat Group of the Conference

TITLE: "Chinese Natural Geography Teaching and Research Conference Held in Nanjing"

SOURCE: Beijing DILI ZHISHI [GEOGRAPHICAL KNOWLEDGE] in Chinese No 7, Jul 80
p 10

ABSTRACT: The Chinese Natural Geography Teaching and Research Conference was held in Nanjing Teachers College 10-20 May 80. Participants included 45 persons representing teachers, map publishers, and the editors of DILI ZHISHI. Professor LI Xudan [2621 2485 2481] Chairman of the Department of Geography, Nanjing Teachers College opened the conference with his report of his opinions on the current curriculum of departments of geography in colleges. The major contents of the conference involved ways of improving the quality of teaching natural geography in China to meet the needs of four-modernization, exchange of fruits of research in natural geography, and the establishment of China Natural Geography Teaching and Research Society. The conference received 30 papers, and most of them were read during the meetings.

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CSO: 4009

AUTHOR: XU Ronglan [1776 2837 2936]
WAN Zhenfu [1354 2182 4395]
MA Fusheng [7456 4395 0524]

ORG: XU and WAN both of the Institute of Space Physics, Chinese Academy of Sciences, MA of the University of Science and Technology of China

TITLE: "The Motion of Charged Particles in a Neutral Magnetic Field"

SOURCE: Beijing DIQIU WULI XUEBAO [ACTA GEOPHYSICA SINICA] in Chinese Vol 23 No 3, Jul 80 pp 233-244

TEXT OF ENGLISH ABSTRACT: In this paper we have studied the motion of charged particles in a neutral magnetic field by means of the perturbation method, trajectory and allowed region of the particles. The results are:

1. The trajectory of the particles can be divided into three forms, and in region $|x| < L = \sqrt{\frac{cmv}{4e \nabla H}}$ away from the neutral line, the perturbation method cannot be used, because there appears a motion in an inverse direction to that in the perturbation method.
2. Some particles are focusing on the neutral region which is caused by the

[Continuation of DIQIU WULI XUEBAO Vol 23 No 3, Jul 80 pp 233-244]

drift under the action of an electric field along the neutral line. When the particles reach the neutral region, they are reflected by the neutral magnetic field and accelerated rapidly by the electric field. This acceleration cannot happen in the perturbation region.

3. The geomagnetic neutral sheet thickness is equal to $1.328 \sqrt{\frac{cmv}{4e \nabla H}}$. In this region the average motion of most of the positively charged particles is along the dawn-dusk direction, and for negatively charged particles an inversed motion. These motions cause a plasma sheet current. The plasma sheet current increases rapidly due to the dawn-dusk electric field.

AUTHOR: HU Wenrui [5170 2429 3843]

ORG: Institute of Mechanics, Chinese Academy of Sciences

TITLE: "Mechanism of Magnetospheric Substorm and the Turbulence of Solar Wind"

SOURCE: Beijing DIQIU WULI XUEBAO [ACTA GEOPHYSICA SINICA] in Chinese Vol 23
No 3, Jul 80 pp 245-253

TEXT OF ENGLISH ABSTRACT: Magnetohydrodynamic waves can be excited in the magnetotail by the momentum fluctuation of solar wind through the magnetopause. The fast magnetohydrodynamic waves thus excited penetrate into the plasma sheet and develop to form the shock waves. The energy of these waves is converted into heat by dissipation or by inter-collisions of the shock waves, and during these processes the plasma is heated. The energetic particles in the tail part of the Maxwellian distribution are then accelerated to a higher energy by the stochastic Fermi mechanism in the plasma sheet. In the quiet state, the equilibrium among the processes of dissipation, plasma heating, particle acceleration and escape is reached. Both heating and accelerating processes are strengthened by the condition that the momentum of the solar wind or its fluctuation is increased greatly. A great number of energetic particles must escape from the plasma sheet, and they will form a plasma stream with high speed which manifests itself as the magnetosubstorm in the magnetosphere.

AUTHOR: TENG Jiwen [3326 0679 2429]

WANG Shaozhou [3769 4801 5297]

YAO Zhenxing [1202 2182 5281]

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ZHU Zhiwen [2612 1807 2429]

YANG Bingping [2799 4426 1627]

ZHOU Wenhui [0719 2429 5706]

ORG: All of the Institute of Geophysics, Chinese Academy of Sciences

TITLE: "Characteristics of the Geophysical Fields and Plate Tectonics of the Qinghai-Xizang Plateau and Its Neighboring Regions"

SOURCE: Beijing DIQIU WULI XUEBAO [ACTA GEOPHYSICA SINICA] in Chinese Vol 23
No 3, Jul 80 pp 254-268

TEXT OF ENGLISH ABSTRACT: In this paper, we have collected all the available data pertinent to the study of this region, such as the crust and upper mantle structures in the Qinghai-Xizang region, the distribution of the geomagnetic field elements, the results of aeromagnetic surveys, the paleomagnetic pole wandering paths, gravity anomalies, geothermal activities, earthquake activities, fault plane solutions and other results of geophysical interests, and try to discover the relationships between these features of the geophysical field and

plate tectonics.

The preliminary results indicate that the northern boundary of the zone where the Indian plate and Eurasian plate are in contact is Yarlung Zangbo River and the southern boundary is on the northern edge of the Ganga plain. The Himalayan zone is a transitional belt whose width is about 300 km or so. Most of the large and small earthquakes occurring in this zone are of shallow foci. Only in the arcuate mountain system and at the vertices of the east and west area as well as the turning points of the range did earthquakes of medium depths occur. In this transitional zone hot water activity is very strong and the gravity field is not in isostatic equilibrium.

From north of the Yarlung Zangbo River to the Daxung region, the crust is 70-73 km thick, but in the Himalayan region the crustal thickness decreases to about 68-45 km and is upwarping towards the south. The crust is multilayered and there exists a low velocity layer in the lower crust. The fault plane solution shows that the fault is thrusting toward the south, the principal compressional stress axis being in general directed either N-S or NE and relating to the focal depth. It seems that the recent tectonic and earthquake activities gradually move toward the south, reaching the great fault of the main boundary.

North of the Yarlung Zangbo, the focal depths of small earthquakes increase toward the south, but in the north of the Ganga plain they increase to the north. In addition, in the two places mentioned above some earthquakes of medium depth occur. Therefore, there are thrusting faults both on the southern and on the northern sides of the Himalayan zone. In the Hindukush region, the plane of the foci of the medium deep earthquakes dips toward the north; in the Pamir zone it dips toward the south. So the plane of the foci forms a "V"-shaped region.

The stress and energy of the tectonic motion in the plateau and its adjacent regions have not been exhausted at all, and have had direct influence on the earthquake activities and structures of the provinces of Sichuan, Shaanxi, Gansu and Ningxia.

AUTHOR: HUAN Wenlin [3883 2429 2651]
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YAN Jiaquan [6768 1367 0356]

ORG: All of the Institute of Geophysics, State Seismological Bureau

TITLE: "The Distribution of Earthquakes' Foci and Plate Motion in the Qinghai-Xizang Plateau"

SOURCE: Beijing DIQIU WULI XUEBAO [ACTA GEOPHYSICA SINICA] in Chinese Vol 23
No 3, Jul 80 pp 269-280

TEXT OF ENGLISH ABSTRACT: In this paper the data of focal depths of a large number of earthquakes which occurred recently in the Qinghai-Xizang plateau and its vicinity are analyzed. We find that not only are there widely distributed shallow earthquakes in this region, but also there are regularly distributed intermediate shocks. These intermediate earthquakes form three seismic zones in this region. The first zone stretches along the plate convergence zone. The planes of foci in the Hindukush and in the India-Burma mountain arc, which are located in the two flanks of the Indian subcontinent, are north-dipping and east-dipping respectively toward the Asian continent. But the planes of foci of intermediate earthquakes in the Indus and Yarlung Zangbo River convergence zone

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are all southward dipping. The second zone is located in the areas of the Pamir, the West Kunlun mountain and the northern margin of the Qaidam Basin. The planes of foci here are all south-dipping. The third zone is located in the southern margin of the Tianshan. The plane of foci here is also south-dipping.

If the above-mentioned inclined focal planes along which many intermediate earthquakes occurred is taken as the subduction zone, then there are three south-dipping lithospheric subduction zones from the Himalayas to Tianshan. The existence of the three southward inclined lithospheric subduction zones implies that it was the Asian plate rather than the Indian plate that has been subducted.

If we regard the depth of the subduction zone as the part which disappeared in the mantle, then the Asian continental crust along the above three subduction zones has become shortened at least 300-700 km since the India-Eurasia collision.

The discontinuous distribution of the intermediate earthquake zones indicates recent activity of some strike slip faults. The large displacements of some strike slip faults show that the lateral movement between the blocks is closely related to the northward movement of the Indian plate.

In the last part of this paper, we proposed a model on the origin of three south-dipping subduction zones in the Asian continent.

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ORG: All of the Institute of Geophysics, Chinese Academy of Sciences

TITLE: "The Average Stress Fields of Zhamo and Daxung Regions in the Xizang Plateau"

SOURCE: Beijing DIQIU WULI XUEBAO [ACTA GEOPHYSICA SINICA] in Chinese Vol 23
No 3, Jul 80 pp 281-290

TEXT OF ENGLISH ABSTRACT: The average stress fields of the Zhamo and Daxung regions in the Xizang Plateau are obtained by smoothing the first motion patterns from the regional seismological observation data. The results are as follows:

1. The compressional axes in the Daxung region and part A of the Zhamo region are roughly in the north-south direction. The angles of elevation of these axes are small, being 23° and 14° respectively. This indicates that the interaction between the two plates is predominantly compression.
2. In part B of the Zhamo region, the compressional axis is in the east-west direction with an angle of elevation of about 51° . This seems to correspond

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to the underthrusting condition.

Such results are basically in accord with the model of collision between the Indian plate and the Eurasian plate and agree with the fault plane solutions of the major earthquakes which occurred in that region. This implies that all earthquakes, whether large or small, are controlled by the plate movement.

AUTHOR: FENG Rui [7458 6904]
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ORG: Both of the Institute of Geophysics, State Seismological Bureau

TITLE: "Q-Value for Surface Waves in the Eastern Region of the Xizang Plateau"

SOURCE: Beijing DIQIU WULI XUEBAO [ACTA GEOPHYSICA SINICA] in Chinese Vol 23
No 3, Jul 80 pp 291-297

TEXT OF ENGLISH ABSTRACT: Based on the seismic records of five earthquakes along four paths across the eastern region of the Xizang Plateau, the Q_R -values for Rayleigh waves are obtained in the period range of 7 to 51 seconds. The results show that this region is distinctly a low-Q region in the continental crust. The average values of Q_R are 31-376. At the shorter periods ($T < 15$ sec) they are higher, $Q_R = 140-380$, and the scatter is greater, while at the longer periods ($T > 40$ sec) they are lower, $Q_R = 30-40$. The observational Q-values are more approximate with the theoretical values in the M88 Q-model.

Such a character of low-Q distribution with frequency implies a strong attenuation for seismic waves across the Xizang Plateau. The reason is not only the large variation of structure in the upper crust of this region which causes seismic waves to scatter strongly, but also the possibility of partially molten

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regions in the crust and lower part of the lithosphere which would absorb the energy of elastic waves. All these phenomena might be related to the plate collision.

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TITLE: "A Three-Component Flux-Gate Magnetometer"

SOURCE: Beijing DIQIU WULI XUEBAO [ACTA GEOPHYSICA SINICA] in Chinese Vol 23
No 3, Jul 80 pp 298-305

TEXT OF ENGLISH ABSTRACT: This paper gives a brief account of the principle, performance and usage of the three-component flux-gate magnetometer for electro-magnetic deep sounding in the Qinghai-Xizang Plateau.

The technical specifications of the instrument are as follows: the resolution is 0.2 γ , sensitivity is 100 mV/ γ ; temperature coefficient is 1 γ /°C; recording frequency band is 0-1.0 Hz; power consumption is 18 W.

The instrument has been used for continuous field observations in five localities

[Continuation of DIQIU WULI XUEBAO Vol 23 No 3, Jul 80 pp 298-305]

in the north and south of Xizang. A complete recording of a magnetic storm was obtained during the period of survey which showed that the instrument was satisfactory.

AUTHOR: YAO Zhenxing [1202 2182 5281]

ORG: Institute of Geophysics, Chinese Academy of Sciences

TITLE: "The Reflectivity Method for a Buried Shear Dislocation Source"

SOURCE: Beijing DIQIU WULI XUEBAO [ACTA GEOPHYSICA SINICA] in Chinese Vol 23
No 3, Jul 80 pp 306-311

TEXT OF ENGLISH ABSTRACT: The reflectivity method in the calculation of synthetic seismograms is extended for the case of a point shear dislocation source buried in a layered medium.

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TITLE: "The Effect of Stress Path on Brittleness and Ductility of Rocks"

SOURCE: Beijing DIQIU WULI XUEBAO [ACTA GEOPHYSICA SINICA] in Chinese Vol 23
No 3, Jul 80 pp 312-319

TEXT OF ENGLISH ABSTRACT: Triaxial compression tests of Jinan gabbro and Yexian marble were performed in the following loading cases (stress path): case A, axial load was increased until the rock sample failed while the confining pressure was kept constant; case B, starting from a certain stress state, the confining pressure was decreased until rocks failed and axial load was kept constant. Under case A and case B the gabbro exhibited brittle behavior up to 1.5 kb, but in case B the gabbro was more brittle than in case A of the same stress state. In case A, when the confining pressure was below 200 bars, the marble exhibited brittle behavior, and when confining pressure was about 200-250 bars, a brittle-ductile transition for marble occurred; above 250 bars the marble exhibited ductile behavior and at that time the ability of sustaining loading in the marble gradually vanished, the level of acoustic emission activity

was very low, the whole failure process lasted a few minutes and the eventual shear fault appeared. However, it was found that some brittle fracture of marble could appear in case B, even though confining pressure was above 250 bars. In this situation the ability of sustaining loading vanished abruptly and acoustic emission increased rapidly before rupture. The brittleness of rocks seems to be related to the stress path.

AUTHOR: WU Lai [0502 1774]

ORG: None

TITLE: "The Large Dip Wave Equation Migration in Time-Domain"

SOURCE: Beijing DIQIU WULI XUEBAO [ACTA GEOPHYSICA SINICA] in Chinese Vol 23 No 3, Jul 80 pp 320-327

TEXT OF ENGLISH ABSTRACT: In this paper, the migration algorithm of the large dip equation in time-domain is given. The migration error caused by the dispersion is calculated. To migrate the synthetic and stacked seismic data with this algorithm proves effective. Finally, some field examples in the complex fault block region are presented.

AUTHOR: TAN Tingdong [6223 1694 2767]
LIU Zongcheng [0491 1350 6134]

ORG: Both of the Scientific Research Institute of Petroleum Exploration and Development

TITLE: "Estimate Abnormal Formation Pressures with Travel Time of Sonic Logging"

SOURCE: Beijing DIQIU WULI XUEBAO [ACTA GEOPHYSICA SINICA] in Chinese Vol 23 No 3, Jul 80 pp 328-332

TEXT OF ENGLISH ABSTRACT: This paper describes a method of estimating abnormal formation pressures, and discusses the following: (1) conventional formula of estimating abnormal formation pressures; (2) according to exponential law, the porosity decreases with increase in strata depth. However, in the intervals of abnormal pressures, the change of porosity deviates from this law; (3) the intervals of equivalent depth points of abnormal pressures were determined with the porosity obtained by the travel time of sonic logging, and then the abnormal pressures were estimated.

We applied the sonic logging data to estimate abnormal pressures in the eastern part of China, and have obtained good results in drilling engineering.

AUTHOR: GUAN Xingguo [7070 5281 0948]

ORG: Shenyang Seismic Station

TITLE: "Characteristics and Analysis of Earth-Tilt Anomalies before the Haicheng Earthquake of M 7.3"

SOURCE: Beijing DIQIU WULI XUEBAO [ACTA GEOPHYSICA SINICA] in Chinese Vol 23 No 3, Jul 80 pp 333-340

TEXT OF ENGLISH ABSTRACT: In this paper, the medium-range, short-range and imminent earth-tilt anomalies before the Haicheng earthquake are examined. The medium-range tilt anomaly was characterized by the violation of the regularity of annual variation. The magnitude of the anomaly may amount to a few seconds, lasting for about half a year. The short-range anomaly was characterized by sudden changes of directions of tilt. It lasted for one or two months. When the earthquake was imminent, the anomaly was characterized by the violation of the smoothness of diurnal variations. It lasted for only a few days before the earthquake and was observed only in the vicinity of the forthcoming epicenter.

AUTHOR: GUO Jun [6751 0689]

ORG: None

TITLE: "New Energy Sources--Protium, Deuterium, and Tritium"

SOURCE: Beijing XIANDAIHUA [MODERNIZATION] in Chinese Vol 2 No 7, 16 Jul 80
pp 6-7

ABSTRACT: The historical background of the 3 isotopes of hydrogen, protium, deuterium, and tritium is briefly told, tracing to the contributions of H. Cavendish (1766), H.C.Urey (1931), and Ernest Rutherford (1934). The most recent attempts of using dinitrogen tetrahydride as fuel for automobiles and the use of heavy water, which is deuterium oxide, in controlled thermonuclear fusion are briefly discussed. Great efforts are being exerted by Chinese scientists to catch up with the advanced level of the world with respect to controlled thermonuclear fusion research. Magnetic compressor, high density plasma focusing device, laser fusion device, and a Tokamak fusion device have all been successfully made in China in recent years. A large number of scientists in China are currently working day and night toward the realization of controlled thermonuclear reaction.

AUTHOR: LI Yan [2621 1484]

ORG: China Society of Explosives for Civilian Use

TITLE: "Slurry Eliminates the Nobel Explosives"

SOURCE: Beijing XIANDAIHUA [MODERNIZATION] in Chinese Vol 2 No 7, 16 Jul 80
pp 10-11

ABSTRACT: The invention of black powder in China during the Tang Dynasty [618-907 A.D.] dynamite by Alfred Nobel of Sweden in the 1860's, and ammonium nitrate-fuel oil [ANFO] by a USA scientist in the 1950's are hailed as the 3 milestones in the history of development of industrial explosives. In the last decade, further development of ANFO into slurries [water gels], the high velocity and very high water resistant explosives and their applications in mining, metal refining, geological prospecting, and hydrological engineering are discussed. One drawing in the paper depicts the result of applying the smooth-surface blasting technique created by a Swedish scientist in the construction of a certain shipbuilding dock in China. Slurries are very suitable for the smooth-surface blasting technique, the paper says. In the USA, slurries have replaced dynamite, while they are also becoming more important as blasting agent in Western Europe and China.

AUTHOR: PAN Jiyi [3382 7139 0076-6855]

ORG: Department of Machinery, Qinghua University

TITLE: "Electron-Beam Welding"

SOURCE: Beijing XIANDAIHUA [MODERNIZATION] in Chinese Vol 2 No 7, 16 Jul 80
pp 16-17

ABSTRACT: In ordinary electric arc welding, air in the arc is heated to above 6000°C, and very strong physical-chemical reactions occur, and impurities will be formed. For example, molybdenum may become as brittle as glass. In the process of electron-beam welding, using an electron gun, the metal does not or rarely come into contact with air, and the problem is largely overcome. In the early period since the technique of electron-beam welding was introduced, every item must be taken into a vacuum chamber in order to be welded. In the last decade, a multi-position welding machine has been introduced to save a lot of air pumping time. In the past few years, in various countries of the world, there have been attempts of using it in the manufacturing process of heavy industrial products; localized vacuum and non-vacuum are the 2 processes being tried. When the problem of vacuum is resolved, the problems of smoke pollution and exhaustive labor of the arc welding shops will be completely eliminated. The paper does not mention the progress of electron-beam welding in China.

AUTHOR: WANG Ganchang [3769 3227 2490]

ORG: President, China Nuclear Society

TITLE: "Development of Research and the Construction of Nuclear Power Stations Should be Encouraged"

SOURCE: Beijing XIANDAIHUA [MODERNIZATION] in Chinese Vol 2 No 7, 16 Jul 80
p 40

ABSTRACT: The author claims that by the year 2000, most of the world's petroleum reserves will be used up and coal mining will also be reduced. In China, the special problem of energy resources is the fact that most coal reserves are in the North, 70 percent of the hydrological power resources are in the Southwest, while energy sources are seriously deficient in the East where there is a heavy concentration of industries. From beginning of research to the production of electrical power from nuclear energy, a period of 6-10 years is generally required. The author, therefore, suggests that (1) A survey of energy needs of the entire country should begin immediately; (2) A national nuclear energy management organization should be established; (3) State's planning committee should authorize staff training programs; (4) Related departments should carry out scientific research preparation work; (5) A widespread propaganda in favor of nuclear energy should be launched in television, newspapers, magazines, etc. to make the people understand the necessity, economy, and safety of nuclear power.

AUTHOR: LI Senlin [2621 2773 2651]

ORG: None

TITLE: "The Basic Theory of Stability of Differential-Difference Equations (Including Neutral Type)"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY, NATURAL SCIENCE EDITION] in Chinese Vol 6 No 1, Jan 79 pp 1-25

TEXT OF ENGLISH ABSTRACT: In this paper the correlations among $\|x(t)\|$, $\|x(t - \Delta(t))\|$, $\|x'(t)\|$ and $\|x'(t - \bar{\Delta}(t))\|$, ($\Delta(t) = \Delta_{is}(t)$, $\bar{\Delta}(t) = \bar{\Delta}_{is}(t)$, $i=1, \dots, n$; $s=1, \dots, m$), are given by the author. These correlations are very important for discussing the stability of the neutral type. Using these correlations in the method of V-function, the condition of $\frac{dy}{dt} < 0$, $t > t_0$ may be avoided (as indicated in reference [3], the positive definite function V such that $\frac{dy}{dt} < 0$, $t \geq t_0$ is difficult to find) and an algebraic method which can be adapted to a wide range and can simply make the decision is obtained. When they are used in the method of variation of constants, we get the results including theorem 3 in reference [4], and for the nonlinear equations of the neutral type

[Continuation of HUNAN DAXUE XUEBAO Vol 6 No 1, Jan 79 pp 1-25]

(variable retardations) we establish the sufficient conditions for their stability, asymptotical stability and instability. In addition, we also get for the general equations of the retarded type the sufficient conditions of stability.

AUTHOR: WEN Lizhi [3306 4539 1807]

ORG: None

TITLE: "The Method of Feeding Bars in Lots and a Theoretical Approach to It"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY, NATURAL SCIENCE EDITION] in Chinese Vol 6 No 1, Jan 79 pp 26-40

TEXT OF ENGLISH ABSTRACT: In this paper a method is suggested by which bars fed in lots are not piled up and wasted, so that good economical results can be obtained. Theoretically it has been proved that this new method is rational; in addition to this, some problems bearing a relationship to it have been studied.

AUTHOR: JIN Daokui [6855 6670 2247]
FANG Peizhi [2455 0160 5347]
XIONG Zhuhua [3574 4376 5478]

ORG: None

TITLE: "Limit Surface Bounds of a Plate"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY, NATURAL SCIENCE EDITION] in Chinese Vol 6 No 1, Jan 79 pp 41-48

TEXT OF ENGLISH ABSTRACT: This paper discusses the inequality of the upper and lower bounds of the limit analysis of an isotropic plate with equal thickness when it is subjected to the action of various loads. The upper and lower boundaries of the limit surfaces can be obtained. By using them it is quite simple to calculate the values of the upper and lower boundaries with loads in arbitrary combinations. The suggested method may be used in the limit design of reinforced concrete slabs.

AUTHOR: WANG Lei [3769 4320]
LI Jiabao [2621 1367 1405]

ORG: None

TITLE: "The Solution of Ordinary Differential Equations Transformed from the System of Linear Algebraic Equations with the Band-shape Coefficient Matrix"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY, NATURAL SCIENCE EDITION] in Chinese Vol 6 No 1, Jan 79 pp 49-60

TEXT OF ENGLISH ABSTRACT: It is suggested by T. V. Kármán that the solution for the three-moments equation in continuous beams may be transformed into the form $y_x = C_1 \beta_1^x + C_2 \beta_2^x$ by using difference of the second order. Kármán's suggestion makes the concept clear and the calculation simple in the designing of these beams.

Using the no shear distributive method, the three-rotations equation and the six-rotations equation we derived in tall buildings is analogous to the three-moments equation, and when reduced to the matrix forms they take the shape of a band. For the multi-story symmetrical frame, we use the difference method to transform it into ordinary differential equation of the second order, while in the multi-story unsymmetrical frame or the pin-connected shear walls and

[Continuation of HUNAN DAXUE XUEBAO Vol 6 No 1, Jan 79 pp 49-60]

the system of shear wall-frame, we use the same method to transform it into a system of two ordinary differential equations of the second order. To solve the system of equations, it is transformed into an equation of the fourth order. By use of the method proposed in this paper, the error is small when compared with the accurate solution.

It is worthwhile to point out that the method we developed from Kármán's method suggests a solution for the system of linear equations with banded matrix of the general form (no matter how wide the band may be).

AUTHOR: WANG Yisun [3769 6318 5549]

ORG: None

TITLE: "Exact Solution for Lamb's Problem"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY, NATURAL SCIENCE EDITION] in Chinese Vol 6 No 1, Jan 79 pp 61-76

TEXT OF ENGLISH ABSTRACT: The exact solution of the vertical component of surface displacement in a homogeneous, isotropic, elastic semi-infinite solid produced by vertical point-source load varying with time, like the Heaviside step-function $H(t)$, is given by the author for an arbitrary Poisson's ratio of the solid. The exact solution for the dynamic vertical surface displacement of the elastic semi-infinite solids under a vertical harmonic point-source load is also presented by the author instead of Lamb's solution of integral expression published in 1904. Applied to the response to a dynamic concentrated load, this solution is matched with the well-known Boussinesq's solution in statics. As it is a precise method, this solution might serve as a criterion for the range of validity of the existing approximate solution. In addition, the rationality of one of the conclusions on this topic drawn by D. D. Barkan is discussed.

AUTHOR: CHEN Zongzhang [7115 1350 3864]
XIE Naixian [6200 0035 6343]
MA Weibin [7456 4850 6333]
JIANG Zhongjin [5592 1813 6930]
HUANG Gaoshan [7806 7559 1472]

ORG: None

TITLE: "The Study of the Polarization of the Na-S Cell"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY, NATURAL SCIENCE EDITION] in Chinese Vol 6 No 1, Jan 79 pp 87-93

TEXT OF ENGLISH ABSTRACT: By applying the K-M sine wave method and using β - Al_2O_3 tube filled with pure sodium as a reference electrode, we have studied the total polarization of the Na-S cell in the course of discharging as well as the polarization of the anodic and cathodic electrodes. The results of measurement show that the polarization of the Na-S cell is mainly the polarization of the resistance, and the resistance, in turn, is formed by the resistance of the porcelain itself. The concentration polarization is very small and chiefly occurs on the interface between the porcelain tube and sulfur.

AUTHOR: JIANG Dingyu [5592 1353 1342]

ORG: None

TITLE: "An Approach to Multifunctional A.C. Dynamometer with Silicon-Controlled Rectifier"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY, NATURAL SCIENCE EDITION] in Chinese Vol 6 No 1, Jan 79 pp 94-109

TEXT OF ENGLISH ABSTRACT: The characteristics of a new type of dynamometer are analyzed and studied. According to the specific feature that a device of a rectifier and an inverter is connected in the circuit of the dynamometer, and by the application of the fundamental principles of A.C. electrical machines, the mechanical characteristics and formulas of calculation have been respectively worked out with relation to the measurement of the output of the active machine and the input of the passive machine. As a result, an evaluation of this type of dynamometer has been made theoretically.

AUTHOR: ZHAO Shisen [6392 0013 2773]

ORG: None

TITLE: "A Method of Reducing Magnetic Errors of Current Transformers"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY, NATURAL SCIENCE EDITION] in Chinese Vol 6 No 1, Jan 79 pp 110-115

TEXT OF ENGLISH ABSTRACT: This paper discusses the cause of producing magnetic errors of current transformers and a method of eliminating them. To transfer power and information simultaneously is the necessary condition which enables current transformers to work normally, but is also the basic cause of producing magnetic errors. Therefore, to set these two processes apart is a method for reducing magnetic errors. Conditions of separation are discussed. Equivalent circuits and the formula for magnetic errors are presented.

AUTHOR: YANG Yigang [2799 3015 0474]

ORG: None

TITLE: "The Calculation of Steady-State Stability in Power Systems with Consideration of the Static Characteristics of Loads"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY, NATURAL SCIENCE EDITION] in Chinese Vol 6 No 1, Jan 79 pp 116-127

TEXT OF ENGLISH ABSTRACT: The practical criterion for steady-state stability $\left(\frac{dP}{dt} \rightarrow 0\right)$ can only be used in the simple power system. In complex systems, the small oscillation method is the critical method to study steady-state stability. By this method, it is assumed that the system operating under given conditions is subjected to small disturbances on which we can write out the differential equations of motion of the system, and according to the sign of the roots of the characteristic equation it is possible to determine whether the system is stable or not.

The variations of voltages in networks have great influence on the power and reactive power taken by the loads. Therefore, it is very important to consider the static characteristics of loads in practical study of steady-state stability.

[Continuation of HUNAN DAXUE XUEBAO Vol 6 No 1, Jan 79 pp 116-127]

This paper mainly discusses the mathematical models and the calculating method of steady-state stability in electrical power systems with consideration of static characteristics of loads by using the small oscillation method.

AUTHOR: ZHONG Zhenghua [6988 2973 5478]
LUO Daoyuan [5012 6670 0337]
HE Zhenxiang [0149 2182 5046]

ORG: None

TITLE: "An Analysis of the Cutter Back-off Interference during the Gear Cutting with a Gear Shaper and the Computation of the Amount of the Cutter Back-off"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY, NATURAL SCIENCE EDITION] in Chinese Vol 6 No 1, Jan 79 pp 128-142

TEXT OF ENGLISH ABSTRACT: According to the principles of kinematics of rigid bodies and the engagement of involute gear, this paper is offered to analyze the location of the cutter back-off interference which may occur between the gear cutter and the workpiece in the process of cutting. Starting from more complicated geometric relations, we have worked out a group of formulae for calculating the amount of the cutter back-off without interference. These formulae show the relations between the parameters involved, thus affording a basis for analyzing their influence on each other and providing the theoretical basis for machine design. At the end of this paper, a numerical example is given to illustrate the computing method of the amount of cutter back-off.

AUTHOR: HE Zhenxiang [0149 2182 5046]
WEN Songming [3306 2646 2494]

ORG: None

TITLE: "High Speed Gear Shaping"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY, NATURAL SCIENCE EDITION] in Chinese Vol 6 No 1, Jan 79 pp 143-153

TEXT OF ENGLISH ABSTRACT: High speed gear shaping is an effective method to increase the productive rate of cutting the thin spur gears. Through the analysis of the specific rules of shaping gears with generating motion, it has been brought forward in this paper that the W18Cr4V high speed shaping cutter made in China is capable of filling the demands of high speed gear shaping, and at the same time, through the technological experiment, the orientation for the realization of high speed gear shaping has been clarified.

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CSO: 4009

AUTHOR: WANG Lei [3769 4320]
LI Jiabao [2621 1367 1405]

ORG: None

TITLE: "Tall Buildings and Coupled Shear Walls"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese
Vol 6 No 2, 1979 pp 1-22

TEXT OF ENGLISH ABSTRACT: Qian Linse and Hu Haichang presented a distributive method of control for analyzing the vierendeel truss of unparallel chords. For the vierendeel truss of parallel chords, this method, the so-called no shear moment distribution method, is applicable only for the case of symmetry of rigidity. This paper makes use of the no shear moment distribution method to calculate accurately the tall frames and the coupled shear walls. The advantages of using this method are: (1) the rigidity may be symmetric or not; (2) the cross sections of columns of any story may be equal or not; and (3) the height of each story may be the same or not. As for the multibay and multi-story frames and shear walls, they may be treated according to the principle of multiple or the method of average rigidity.

AUTHOR: YU Ruqin [0205 3067 0530]
GONG Hongzhong [7895 3163 6988]
CHEN Chengzhi [7115 6134 0037]
YUAN Chong [5913 0394]
SHEN Guoli [3088 0948 0536]
HE Po [0149 3124]

ORG: None

TITLE: "Studies on Construction of Ammonia Gas-Sensing Membrane Electrode"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese
Vol 6 No 2, 1979 pp 23-33

TEXT OF ENGLISH ABSTRACT: The art of making the ammonia gas-sensing membrane electrode has been investigated and the analytical behavior of this electrode described. An experimental study is dedicated to a comparison of flat-ended pH electrodes whose sensing membranes are prepared from glasses of different compositions. The membrane resistance has been found to vary from about 10 to above 1,000 M Ω , the lower values being obtained with membrane compositions which contain uranium or tantalum. A method of casting thin polyvinylidene fluoride membranes over glass plates has been described in detail. The best

[Continuation of HUNAN DAXUE XUEBAO Vol 6 No 2, 1979 pp 23-33]

poor-forming agents are dibutyl phthalate and tributyl phosphate in mixture. The electrode gives a Nernstian response from 1,000 to 1 mg/l, the detection limit being about 0.1 mg/l.

AUTHOR: DING Zhongqi [0002 6988 1142]

ORG: None

TITLE: "A Method of Calculation of Large Signal Frequency Changing"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese Vol 6 No 2, 1979 pp 34-46

TEXT OF ENGLISH ABSTRACT: In practice we may find that the signal voltage is commensurable with the local oscillato voltage in frequency changing, i.e., the large signal frequency conversion. This frequency conversion is investigated in this paper. The parameters of the single grid and double grid frequency changers are derived by the broken-line method and hyperbolic functions.

AUTHOR: DUAN Zhenghua [3008 2973 5478]

ORG: None

TITLE: "Stochastic Control of Multi-arm Multi-signal and Multipass Wire Broadcasting"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese Vol 6 No 2, 1979 pp 47-57

TEXT OF ENGLISH ABSTRACT: On the basis of the concept of "Complete Group," a fundamental circuit of control is derived. Thus the author is able to use a simpler form of circuit to make possible the "five options at will" in the control of multi-arm, multi-signal and multipass system of wire broadcasting and the expected goal is successfully attained. The derived "stochastic circuit" can also be used in cases similar to the above-mentioned system.

AUTHOR: TANG Guangfa [3282 1684 4099]

ORG: None

TITLE: "Calculation of Natural Ventilation of Single Span Workshop with Consideration of the Action of Wind Pressure"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese Vol 6 No 2, 1979 pp 58-68

TEXT OF ENGLISH ABSTRACT: This article studies the characteristics of the coefficient of resistance of skylight ventilation under the action of outdoor wind force. The partial resistance coefficient of skylight under the action of wind pressure is a variable.

Through this research, we find that outdoor wind is not always a profitable factor. Under some conditions, it would become an unprofitable factor which has to be considered in calculations.

For convenience, the author, based on the results of experiments, presents an equation for calculating natural ventilation under the action of wind pressure.

AUTHOR: LU Shangqiang [7120 1424 1730]

ORG: None

TITLE: "The Structural Matrix of a Labeled Graph and the Reconstruction Conjecture with the Problems Related to It"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese Vol 6 No 2, 1979 pp 69-84

TEXT OF ENGLISH ABSTRACT: On the basis of P. Kelly's theorem, in §1-§5 the author investigates at large the reconstruction conjecture (r.c.) from the structural form in which the $(n-2)$ -order derived subgraphs of an n -points graph G occur in G . With the concepts of the structural matrix, the column-symmetry-preserving rearrangement of a symmetrical matrix, etc., we first establish some proposition equivalent to the r.c. Then, from the forms of the structural matrices, we pick out some classes of graphs (which include P.Z. Chinn's result as a particular case), the reconstructions of which are unique, and the essential difficulties in the general case from the viewpoint of the structural matrices are analyzed. In §6, the reconstructions of partial labeled graphs, the problem of uniqueness of coloring graphs and the relationship between them are discussed. In §7 P. Kelly's theorem is extended to the hypergraphs. The

[Continuation of HUNAN DAXUE XUEBAO Vol 6 No 2, 1979 pp 69-84]

problems and conjectures presented in this paper may stimulate a new approach to the r.c. and the problems related to it, and some of them may be of independent meaning in graph theory.

AUTHOR: WEN Lishi [3306 4539 1817]
CHEN Qiang [7115 4730]

ORG: None

TITLE: "The Sufficient Conditions of Stability of Differential Difference Equation of Neutral Type"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese Vol 6 No 2, 1979 pp 85-90

TEXT OF ENGLISH ABSTRACT: This paper presents several sufficient conditions concerning the stability of differential difference equations of the neutral type which are based on the method of Liapunov's function and the criterion of stability of ordinary differential equations.

AUTHOR: HUANG Yongjian [7806 7167 0313]

ORG: None

TITLE: "Volume Coordinates of N-Dimensional Euclidean Space and Its Applications"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese Vol 6 No 2, 1979 pp 91-101

TEXT OF ENGLISH ABSTRACT: In this article, the author presents an analytic definition of volume coordinates of n-dimensional Euclidean space, discusses its algebraic and integral properties and obtains a calculation formula.

AUTHOR: ZHOU Shuzi [0719 0647 1311]
TAN Bangben [6223 6721 2609]

ORG: None

TITLE: "On the Convergence of Semi-analytical Finite Element Method (1)"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese
Vol 6 No 2, 1979 pp 102-110

TEXT OF ENGLISH ABSTRACT: This paper discusses mainly the convergence of the semi-analytical finite element method for the Dirichlet problem on the axis-symmetrical domain. If the middle of the domain is hollow, the same results will be obtained as by the general finite element method. For example, adopting the linear elements, the difference between the exact solution u and its approximation u^h satisfies: $\|u-u^h\|_1; \Omega = O(h)$, $\|u-u^h\|_0; \Omega = O(h^2)$. This paper also analyzes finite strip method and even uniform convergence in some cases is obtained.

AUTHOR: JIN Jiucheng [7246 0046 2052]

ORG: None

TITLE: "The Principle of Virtual Displacement and Equilibrium of Nonholonomic System"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese
Vol 6 No 2, 1979 pp 111-118

TEXT OF ENGLISH ABSTRACT: In this paper, the equilibrium definition of a mechanical system and the proof of sufficiency and necessity of the principle of virtual displacement are generalized to the ideal nonholonomic system. In addition, the author also presents the concept of proper motion of a system and the view that the principle of virtual displacement is of even wider physical meaning, that is, the sufficient and necessary conditions for the system to keep its proper motion.

9717
CSO: 4009

AUTHOR: GUO Yuqi [6753 5124 3823]

ORG: None

TITLE: "A Decomposition of Regular Languages with Respect to Regular P- (S-) Languages"

SOURCE: Lanzhou LANZHOU DAXUE XUEBAO (ZIRAN KEXUE BAN) [JOURNAL OF LANZHOU UNIVERSITY (NATURAL SCIENCES EDITION)] in Chinese No 2, 1980 pp 1-10

TEXT OF ENGLISH ABSTRACT: For the study of the algebraic structures of the formal languages, in this paper we have discussed a finite decomposition of the regular languages with respect to regular P (prefix)-languages, involving operations "U", ".", "*". We have proved the existence and uniqueness of this decomposition. With regard to regular S (suffix)-languages, we have obtained a parallel result as well.

AUTHOR: CHEN Guanghua [7115 0342 5478]
WU Jinhua [0702 6930 5478]
WANG Yinyue [3769 0603 2588]
ZHANG Fangqing [1728 0119 3237]
GAN Runjin [3927 3387 0093]

ORG: None

TITLE: "Studies of Doped Mn Characteristics in the Chalcogenide-Glass"

SOURCE: Lanzhou LANZHOU DAXUE XUEBAO (ZIRAN KEXUE BAN) [JOURNAL OF LANZHOU UNIVERSITY (NATURAL SCIENCES EDITION)] in Chinese No 2, 1980 pp 11-16

TEXT OF ENGLISH ABSTRACT: Dependences of the conductivity on the temperature and ESR signal and the strength curve of x-diffraction were measured to the chalcogenide glasses $\text{Ge}_{15}\text{Te}_{81}\text{S}_2\text{Sb}_2$ of doped Mn. Effects of doped Mn on the conduction and the structure in the amorphous semiconductors were also studied.

AUTHOR: WU Daoshan [0702 1405 0810]
HE Xiaoyu [0149 1321 3842]
WANG Ling [3769 3781]
ZHENG Shuiyu [6774 3055 3768]

ORG: WU of Lanzhou University; HE, WANG and ZHENG all of Luoyang Institute of Tractor Research

TITLE: "The Phase Structure of Boronizing Lamella in Steels and Its Mechanism of Formation"

SOURCE: Lanzhou LANZHOU DAXUE XUEBAO (ZIRAN KEXUE BAN) [JOURNAL OF LANZHOU UNIVERSITY (NATURAL SCIENCES EDITION)] in Chinese No 2, 1980 pp 17-28

TEXT OF ENGLISH ABSTRACT: In this paper the experiment, by the X-ray diffraction method, results in the boronizing lamella which is composed of FeB, Fe₂B, M₃(C,B), with FeB and Fe₃B in the shape of needles; electron microscope observation shows that M₃(C,B) are very thin particles dispersed in FeB and Fe₂B.

Based on the X-ray diffraction and electron microscope observation, we suggest the mechanism of boronizing lamella formation.

AUTHOR: YANG Zheng [2799 2973]
ZUO Tongsheng [1563 0681 3932]
ZENG Huaxian [2582 5478 3768/0341]
CHEN Gongxin [7115 0501 0207]

ORG: YANG and ZUO both of the Department of Physics; ZENG and CHEN both of the Department of Chemistry

TITLE: "A Study of Soft-magnetic Ferrites by Coprecipitation in the Form of Oxates"

SOURCE: Lanzhou LANZHOU DAXUE XUEBAO (ZIRAN KEXUE BAN) [JOURNAL OF LANZHOU UNIVERSITY (NATURAL SCIENCES EDITION)] in Chinese No 2, 1980 pp 29-40

TEXT OF ENGLISH ABSTRACT: The chemical compositions, structure and topography of the Mn-Zn and Ni-Zn ferrite powders prepared by chemical coprecipitation have been investigated by chemical analysis, differential thermal analysis, X-ray diffraction and SEM analysis. The formation of ferrite spinels in the heating process is discussed on the basis of the results. It is shown that by suitably choosing preparation conditions, ferrite powders with desirable microstructures and properties are obtained.

AUTHOR: GE Molin [5514 1075 2651]
GAO Xinhai [7559 1800 3189]

ORG: None

TITLE: "Asymptotic Behavior of Interaction Charge in Non-Abelian Theory"

SOURCE: Lanzhou LANZHOU DAXUE XUEBAO (ZIRAN KEXUE BAN) [JOURNAL OF LANZHOU UNIVERSITY (NATURAL SCIENCES EDITION)] in Chinese No 2, 1980 pp 41-49

TEXT OF ENGLISH ABSTRACT: The asymptotic behavior of the effective interaction charge of QCD is discussed. The method used is quite different from that of the renormalization group. It may be considered as QED with non-linear derivative coupling terms. The results thus derived agree with those of the renormalization group in QCD under the lower approximation.

AUTHOR: WANG Shu [3769 2562]
PAN Jiangang [3382 0256 0474]

ORG: None

TITLE: "Poly-functional Automatic Differential Cathode Ray Polarography"

SOURCE: Lanzhou LANZHOU DAXUE XUEBAO (ZIRAN KEXUE BAN) [JOURNAL OF LANZHOU UNIVERSITY (NATURAL SCIENCES EDITION)] in Chinese No 2, 1980 pp 50-57

TEXT OF ENGLISH ABSTRACT: This thesis introduces an automatic differential cathodic ray polarography, which has been made successfully. In addition to the ordinary measurement, it can be applied to the comparative polarography, the subtractive polarography and the twin cell derivative polarography. The second derivative polarography can also be performed with this instrument. The current-voltage curves can be drawn automatically by X-Y recorder and the peak height indicated by the figure.

AUTHOR: PENG Zhouren [1756 0719 0086]
HAN Yingjian [7281 2019 1696]
JIANG Zhuzhong [5592 2691 0022]
ZHAO Shuangao [6392 7175 6956]

ORG: None

TITLE: "A DJS-21 Type Computer Program in Algorithmic Language"

SOURCE: Lanzhou LANZHOU DAXUE XUEBAO (ZIRAN KEXUE BAN) [JOURNAL OF LANZHOU UNIVERSITY (NATURAL SCIENCES EDITION)] in Chinese No 2, 1980 pp 58-64

TEXT OF ENGLISH ABSTRACT: The semiempirical CNDO/II method has been programmed for a DJS-21 type digital computer by means of algorithmic language. Many successful calculations have been performed by this program, and it is provided for the readers interested in doing quantum chemistry calculations.

AUTHOR: MA Yongxiang [7456 3057 4382]
LI Mingsheng [2621 2494 3932]

ORG: None

TITLE: "Synthesis of Tetraallylsilane"

SOURCE: Lanzhou LANZHOU DAXUE XUEBAO (ZIRAN KEXUE BAN) [JOURNAL OF LANZHOU UNIVERSITY (NATURAL SCIENCES EDITION)] in Chinese No 2, 1980 pp 65-79

TEXT OF ENGLISH ABSTRACT: We report here the synthesis of tetraallylsilane. Tetraallylsilane was obtained by the action of the tetrachlorosilane on the allyl Grignard reagent. The modified method gave tetraallylsilane in 82 percent yield, which is more than twice as much as the yield of the Fishwick method. The operation has been simplified, and the preparation and some properties of tetraallylsilane are described.

AUTHOR: ZHANG Ziyi [1728 5261 5030]
 DUAN Zhixing [3008 1807 5281]
 CHEN Limin [7115 4539 3046]

ORG: None

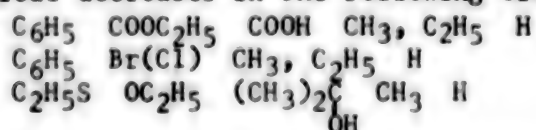
TITLE: "The Addition of Thiophenol to Phenylacetylenebromide"

SOURCE: Lanzhou LANZHOU DAXUE XUEBAO (ZIRAN KEXUE BAN) [JOURNAL OF LANZHOU UNIVERSITY (NATURAL SCIENCES EDITION)] in Chinese No 2, 1980 pp 80-86

TEXT OF ENGLISH ABSTRACT: Under the initiation of benzoyl peroxide or ultra-violet light, the free radical addition of thiophenol to phenylacetylenebromide has been studied. The expected one-to-one adduct of x-phenyl-b-phenylthiyl-vinylbromide was obtained in poor yield and the compound of telomerization was the main product. The adduct was oxidized with 30 percent H_2O_2 in glacial acetic acid to give a sulfone, α -phenyl-1-phenylsulfonyl-vinylbromide. The structure of this adduct was proved through the reaction of the sulfone with ethoxide-catalyst in alcohol to eliminate HBr and yield phenylsulfonylphenylacetylene. The fact that phenylthiyl radical is linked to the carbon adjacent to bromine atom showed that the orientation of the addition is independent of selective polar effects and that the relative stability of the intermediate free radical involved is the determining factor since the conjugative effect

[Continuation of LANZHOU DAXUE XUEBAO (ZIRAN KEXUE BAN) No 2, 1980 pp 80-86]

of the phenyl group is greater than that of bromine atom. From the results reported in this paper and the preceding papers it is seen that the effect of substituents linked to multiple bonds on the stability of the intermediate radical decreases in the following order:



When the reaction with thiophenol and phenylacetylenebromide was carried out under the ethoxide-catalyzed condition, the same product was obtained.

AUTHOR: WANG Xunling [3769 0534 7117]
CHEN Qingcheng [7115 1987 6134]

ORG: None

TITLE: "A Study on the Response of Plants to Ozone Injury under the Condition of a Fumigation Experiment"

SOURCE: Lanzhou LANZHOU DAXUE XUEBAO (ZIRAN KEXUE BAN) [JOURNAL OF LANZHOU UNIVERSITY (NATURAL SCIENCES EDITION)] in Chinese No 2, 1980 pp 87-99

TEXT OF ENGLISH ABSTRACT: This paper deals with the response of plants to ozone effects. Experiments have been carried out for three years under artificial mimic conditions. Ozone was generated through the ionization of oxygen in the ambient air by high electrical pressure of over 13,000 volts. Ninety-three plant species have been subjected to fumigation with ozone. The ozone concentrations ranged from 0.7 ppm to 1.5 ppm. The purpose of this paper is the search for the following aspects: (1) the susceptibility and resistance of various plants to ozone injury; (2) types of injury symptoms to ozone and the relationship among them; and (3) the degree of maturity of leaves in relation to sensitivity. Some preliminary conclusions are as follows.

Symptoms of ozone injury vary considerably with species or varieties. Among

[Continuation of LANZHOU DAXUE XUEBAO (ZIRAN KEXUE BAN) No 2, 1980 pp 87-99]

the 93 fumigated species, 55 of them manifested conspicuously visible injury symptoms, of which 24 species were appraised most sensitive to ozone. Thirty-eight species failed to develop injury during exposure to ozone and they were looked upon as resistant plants, of which many are superior greening trees in the region of Lanzhou and northwestern China. A list of plant species which are relatively sensitive to ozone is provided in this paper.

Five types of ozone injury symptoms have been identified through fumigation experiments in our laboratory. They are: (1) Chlorosis; (2) upper-surface or either-surface bleaching; (3) pigmented lesion; (4) bifacial necrosis, and (5) membranous or papery areas due to the sinking of either surface of a leaf. The above-mentioned symptoms are not consistent and should be considered as different stages in the development of ozone damages. Symptoms often initiate from chlorosis or bleaching spots and then develop in accordance with two courses and finally arrive at necrosis or membranous areas. The relation among them constitutes a frame of netting system.

In our experiments, plant leaves with different degrees of maturity expressed different susceptibility to ozone damage. Matured leaves of various species contracted 61.81 percent of injury, 18.18 percent occurred on semi-matured

[Continuation of LANZHOU DAXUE XUEBAO (ZIRAN KEXUE BAN) No 2, 1980 pp 87-99]

leaves, 16.36 percent on young leaves and 3.63 percent were indifferent. Such a result is by no means in accord with the information reported by certain foreign researchers.

AUTHOR: SHI Jiekuan [2457 0094 1401]

ORG: None

TITLE: "A Statistical Model on Air Pollution Affected by Meteorological Factors of Boundary Layer in Lanzhou City"

SOURCE: Lanzhou LANZHOU DAXUE XUEBAO (ZIRAN KEXUE BAN) [JOURNAL OF LANZHOU UNIVERSITY (NATURAL SCIENCES EDITION)] in Chinese No 2, 1980 pp 100-108

TEXT OF ENGLISH ABSTRACT: In this paper seven regression equations which show the air pollution of the city of Lanzhou correlates with the meteorological factors are erected. These equations have been tested and proved by practice. The function that every meteorological factor affects the concentration of air pollution has been discussed. The temperature gradient and the wind speed of the lower boundary layer and the weather situation are the most important factors. The possible mixing space that is decided by these factors has more intimate correlation with the grade of air pollution.

9717

CSO: 4009

Physical Sciences

AUTHOR: WANG Yisun [3769 6318 5549]
ZHOU Hanrong [0719 3352 2837]

ORG: None

TITLE: "A Method of Calculation for the Vibration of a Rigid Footing Subjected to Impact Loading"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese
Vol 7 No 1, Mar 80 pp 1-12

TEXT OF ENGLISH ABSTRACT: A simple and convenient method for calculation of the vibration of a rigid footing subjected to impact loading on an elastic half-space is established by the "Equation-Comparison Method." This method can be used for both surface and embedded footings. Results obtained by using this method are compared with the existing exact solution. A large number of tables for practical uses are also presented.

AUTHOR: YE Guozheng [5509 0948 6927]
LI Zhimin [2621 4442 3046]

ORG: None

TITLE: "Analysis of Fatigue Fracture of Bituminous Pavement"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese
Vol 7 No 1, Mar 80 pp 13-25

TEXT OF ENGLISH ABSTRACT: This paper describes the stress state of the two layer pavement system under the action of single and twin circular loading and illustrates it with two radial stress contours. Based on the results of field investigations of the fatigue cracking phenomenon, the mechanism of the development and propagation of cracks is studied with reference to the principles of fracture mechanics. The law of the variation of crack propagation in pavements containing bituminous surfacing and soil-lime base is summarized. This analysis might be useful to pavement design when the fatigue cracking design subsystem is taken into account.

AUTHOR: YUAN Shiquan [5913 0013 4019]

ORG: None

TITLE: "Analysis of the Mechanism of Ferrous Iron Removal from Ground Water in the Region of the Dongting Lake"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese Vol 7 No 1, Mar 80 pp 26-39

TEXT OF ENGLISH ABSTRACT: This paper presents a new method for removal of ferrous iron from ground water employed in the water works of Hanshou County by using natural aeration and contact catalysis with manganesian sand. This method has the following characteristics: adoption of advanced technology, having an automatic operation system and no use of reagents. The equipment used is simple and easy to operate. The suggested method may generally be used for ferrous iron removal from ground water in the region of Dongting Lake.

AUTHOR: YE Zhenguo [5509 6966 0948]

ORG: None

TITLE: "The Prevention of 'Lapping' and Computations for the Operation of the Automatically Controlled Gates"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese Vol 7 No 1, Mar 80 pp 40-55

TEXT OF ENGLISH ABSTRACT: This paper describes a new type of gate which is automatically controlled and operated by the pressure of water. During operation there arises the problem of "lapping" of the gate against its support; this will be harmful to the safe operation of the gate. Based on the results of theoretical analysis and experimental studies, the author presents the method of prevention of the "lapping" action of the gate and the factors to be considered in the design and construction of the gate.

AUTHOR: LI Xianji [2621 7359 3444]
QIU Guangyi [8002 0342 6146]

ORG: None

TITLE: "An Experimental Study of the Attachment of Ordinary External Equipment to the M6800 Microcomputer System"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese
Vol 7 No 1, Mar 80 pp 56-70

TEXT OF ENGLISH ABSTRACT: This paper presents the testing results of the attachment of ordinary external equipment to the M6800 microcomputer. After a brief description of the M6800 system used in this test, the hardware interface and the management program of each piece of external equipment is explained.

AUTHOR: TONG Tiaosheng [4547 6148 3932]

ORG: None

TITLE: "The Initial Value Operators and Subtransient E.M.F. of Synchronous Electrical Machines"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese
Vol 7 No 1, Mar 80 pp 71-78

TEXT OF ENGLISH ABSTRACT: The operation expressions are derived from the differential equations of dqo coordinate system of synchronous electrical machines by Laplace transformation, and the initial operators are also derived. Thus the initial value theorem or the magnetic linkage conservation theorem of rotor superconductive circuit can be applied directly to the operation expressions, and the initial values of the subtransient E.M.F. are derived from the initial value operators and initial conditions of the operation expressions.

AUTHOR: HE Fu [6320 1788]

ORG: None

TITLE: "Error Analysis of Amplitude Detection Type Inductosyn Digital Display Equipment"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese Vol 7 No 1, Mar 80 pp 79-90

TEXT OF ENGLISH ABSTRACT: Based on mutual induction, this paper briefly describes the operating principles of the amplitude detection type inductosyn digital display equipment, and in particular an analysis of several errors of the equipment is made.

AUTHOR: ZUO Zongyang [1562 1350 0111]

ORG: None

TITLE: "Two Special Kinds of Mappings and Their Application to the Drawing of Intersection of Two Quadric Surfaces"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese Vol 7 No 1, Mar 80 pp 91-111

TEXT OF ENGLISH ABSTRACT: The author analyzes and develops two special kinds of mappings--circular projection and quadratic transformation.

The author explores mathematically the various possibilities of a conic section to be transformed into a straight line or a circle by applying these two kinds of mappings and thus presents an effective and convenient method for directly finding the points of intersection of two conic sections in some cases without drawing the curves themselves.

When drawing the intersection of two quadric surfaces, we cut them with appropriate auxiliary planes; in the sections conic sections or straight lines are obtained. Applying the two kinds of mappings mentioned above we can find a series of points on the intersection of the two surfaces in each case without drawing the conic sections at all.

AUTHOR: G.F. Xiankang [7514 6443 1660]

ORG: None

TITLE: "The Influence of the Air Swirl Ratio in Swirl Chamber on Performance of Small High-Speed Diesel Engines"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese Vol 7 No 1, Mar 80 pp 112-124

TEXT OF ENGLISH ABSTRACT: This paper analyzes the influence of the air swirl movement on the combustion process. Applying the principle of the moment of momentum to the calculation of the air swirl ratio, and combining the calculation with the studies and tests of the swirl chamber of the 165F diesel engine, the author points out the influence of the air swirl ratio on the performance of small high-speed diesel engines and presents the numerical range of the optimal swirl ratio and design data of the swirl chamber.

AUTHOR: LI Rubai [2621 1172 2672]
ZHOU Mingcheng [0719 0682 2052]

ORG: None

TITLE: "Determination of Low Concentration of Cyanide in Water with a Silver Sulfide Electrode"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese Vol 7 No 1, Mar 80 pp 125-129

TEXT OF ENGLISH ABSTRACT: This paper describes a method for measuring low concentration of cyanide in water with a silver sulfide electrode. The organic matter and interference ions (S^{2-} or I^-) can be oxidized with permanganate solution. The sample is passed through the cation exchange resins for removing cations and liberating cyanide ions. By using Gran's plot method, trace amounts of cyanide at ppb level can be determined with required accuracy.

9717
CSO: 4009

AUTHOR: LI Senlin [2621 2773 2651]

ORG: None

TITLE: "The Basic Theory of Stability of Functional Differential Equations"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese
Vol 6 No 3, Sep 79 pp 1-14

TEXT OF ENGLISH ABSTRACT: In this paper we study the stability of functional differential equations and obtain the sufficient conditions of stableness (asymptotically stable) and unstableness. This paper implies the results of previous papers. In Theorem 1.3 of this paper we use the condition $V(t) \leq V(t)$ instead of the conditions $V(t) \leq P(V(t))$, $t-r \leq t \leq t$, $P(s) > s$ (function $P(s)$ in general is difficult to find, as indicated in the reference). Theorem 1.4 of this paper, using the property of the function of Liapunov, gives a simple method to make possible the decision of stability of the functional differential equations. In this paper we also study the stability of the second type of functional differential equations (the interval of the integration is $[t_0, t]$).

AUTHOR: WANG Zhicheng [3769 1807 2052]
QIAN Xiangzheng [6929 4382 1767]

ORG: None

TITLE: "The Method of Liapunov Functionals for Functional Differential Equations"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese
Vol 6 No 3, Sep 79 pp 15-24

TEXT OF ENGLISH ABSTRACT: In this paper, we discuss the stability of retarded and neutral functional differential equations and, employing Liapunov functionals, we obtain some sufficient conditions for uniform stability and uniform asymptotic stability. As a corollary of our results, the corresponding stability theorem of functional differential equations in the text of Hale is included.

AUTHOR: FANG Ainong [2455 1947 6593]

ORG: None

TITLE: "On Integral Operator and Representation Theorem of a Solution for the Problem of Oblique Derivative"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese Vol 6 No 3, Sep 79 pp 25-43

TEXT OF ENGLISH ABSTRACT: We have proved equivalence between the problem of oblique derivative of the non-linear elliptic system (A)

$$W_z = g(Z, W, W_z), \quad |Z| < 1 \quad (A.1)$$

$$|g(Z, W, W_z^1) - g(Z, W, W_z^2)| \leq q_0 |W_z^1 - W_z^2|, \quad q_0 = \text{const} < 1 \quad (A.2)$$

and the problem P which consists in finding a solution $W(z)$ of this system (A) in the unit disk K and satisfying on its boundary $|z| = 1$ the condition

$$R_e(Z^{-n} W_z) = 0.$$

We have constructed two integral operators $\Gamma(\omega)$ and $\Gamma_1(\omega)$ which satisfy the boundary conditions of problem P, established their complete continuity and differentiability, studied the norms of their differential operator $\pi(\omega)$ and $\pi_1(\omega)$. We have also proved the representation theorem of solution of the problem P

[Continuation of HUNAN DAXUE XUEBAO Vol 6 No 3, Sep 79 pp 25-43]

$$W(Z) = \begin{cases} \Gamma(\omega) + \Phi(Z), & \text{if } n \geq -1, \\ \Gamma_1(\omega) + \text{const}, & \text{if } n \leq -2, \end{cases}$$

where $\omega = W_z$, $\Phi(Z)$ is an analytic function in K , and satisfied on the boundary $|Z| = 1$ the condition $R_e[Z^{-n} \Phi'(Z)] = 0$.

AUTHOR: LI Lijun [2621 0500 6874]
FU Jiecai [0102 2638 2088]

ORG: None

TITLE: "A Study of Grinding Force Mathematical Model"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese
Vol 6 No 3, Sep 79 pp 44-55

TEXT OF ENGLISH ABSTRACT: Grinding forces are composed of chip formation forces and friction forces. Based on this concept, we obtain a new grinding force model. It is composed of two terms corresponding to chip formation forces and friction forces respectively.

Relationships between grinding forces and grinding parameters with workpieces of different materials are determined experimentally. The results indicate a close agreement with the model proposed.

We have also analyzed the ratio between tangential forces and normal forces with respect to both chip formation forces and friction forces. The ratio generally falls within the range of $0.2 \sim 0.59$. When workpieces of different

[Continuation of HUNAN DAXUE XUEBAO Vol 6 No 3, Sep 79 pp 44-55]

materials are ground, the measured values of the ratio are within this range.

Based on the grinding force model obtained, problems such as the significance of equivalent chip thickness and the range of applicability of high speed grinding are discussed.

AUTHOR: LI Chuan-qian [2621 0278 0051]

ORG: None

TITLE: "A Study of the Design and Computation of Machine Tool Guideway According to Its Wear Pattern"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese Vol 6 No 3, Sep 79 pp 56-76

TEXT OF ENGLISH ABSTRACT: This paper studies the wear pattern of machine tool guideways by means of a wear test of the latter. It also studies the carriage or table crosswise movement and swivel caused by the wear of the guideway. The effect on machining accuracy due to the wear of the guideway is discussed. Intending to lessen this effect and by referring to the wear pattern, the methods of design and computation of the guideway are thoroughly studied.

AUTHOR: HE Zhenxiang [0149 2182 5046]
WEN Songming [3306 2646 2494]
HUANG Shengchang [7806 4164 7022]

ORG: None

TITLE: "A Study of the Vibration Sources of the High Speed Gear Shaping Machine and Its Vibration Characteristics"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese Vol 6 No 3, Sep 79 pp 77-95

TEXT OF ENGLISH ABSTRACT: Through the study of the vibration sources and characteristics of a specimen machine of the vertical high speed gear shaper, the main patterns of vibration are found out for this type of machine and the vibration problems to be considered in design are shown. At the same time, during the design of the machine, by using the method proposed in this paper, it is possible to compute approximately the magnitude of the exciting force from the vibration source and its influence on the rocking vibration of the whole machine.

AUTHOR: CHEN Zongzhang [7115 1350 3864]

ORG: None

TITLE: "A Preliminary Research of Making Pure Sodium and Caustic Soda by Electrolyzing Sodium Chloride or Crude Sodium and Using Ceramic Materials β -Al₂O₃ as a Membrane"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese Vol 6 No 3, Sep 79 pp 96-102

TEXT OF ENGLISH ABSTRACT: This paper describes the possibility of making pure sodium and caustic soda by electrolyzing a mixture of melted sodium chloride or crude sodium and using ceramic materials β -Al₂O₃ as a membrane at about 320°C. The experiments demonstrate that this is a new method of production. It will, in a certain sense, improve the process of manufacturing pure sodium and caustic soda.

AUTHOR: ZHANG Jishuang [1728 1323 3642]
WU Boning [0702 0130 1380]
CHEN Shengzong [7115 5116 1350]

ORG: None

TITLE: "A New Liquid Insulator"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese Vol 6 No 3, Sep 79 pp 103-109

TEXT OF ENGLISH ABSTRACT: The poisonous and physical properties, chemical composition and structure of Butylchloro-diphenyl oxide are described. Experimental data show that it is a new type of liquid insulating material of good quality. It is safe and dependable to impregnate an electric condenser with. In addition, it can be used as an electric insulator in other electric equipment and as a heat carrier material in chemical production.

AUTHOR: WANG Lei [3769 4320]
LI Jiabao [2621 1367 1405]

ORG: None

TITLE: "Analysis of Interaction of Shear Walls and Frames--Analysis of Tall Buildings with No Shear Moment Distribution Method"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese Vol 6 No 3, Sep 79 pp 110-119

TEXT OF ENGLISH ABSTRACT: The No Shear Moment Distribution Method used in the analysis of combined shear walls-frames systems proposed in this article has many advantages: simple and convenient formulas, clear and definite physical conception. It is applicable to shear walls with varying cross-sectional areas. The shear walls do not need to reach the top story. Also, it is not necessary for columns and beams to have the same stiffness in various stories of the building. At the end of this article, the results obtained by the no shear moment distribution method are compared with an example analyzed by the Soviet Antonyev's method. The results of distribution obtained by the latter method are somewhat unreasonable.

AUTHOR: YE Guozheng [5509 0948 6927]
LI Zhimin [2621 4442 3046]
LIU Haoxi [0491 3185 3356]
ZHAO Hantao [6392 3352 3447]

ORG: None

TITLE: "A Study of Stresses and Strains of Flexible Pavement"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese Vol 6 No 3, Sep 79 pp 120-136

TEXT OF ENGLISH ABSTRACT: This paper describes several instruments made by the authors used for the measurement of the mechanistic parameters of pavement. The instrumentation and testing technique for static and dynamic loading tests in pavement testing tank are discussed. Test verifications for the stresses and strains in pavement under the action of single and twin circular loading plate and static and slow-moving dynamic dual tire truck loads are also performed. The results of the test are compared with the values obtained by the elastic theory of layered systems and the finite element method. The fundamental law of the change of stresses in the subgrade and of strains in the pavement with the variation of loads and structural parameters of the pavement is studied. The data obtained might provide a scientific basis for the working out of a new specification for the structural design of flexible pavement.

AUTHOR: PENG Yongjin [1756 3057 6651]
FEI Bingquan [6316 3521 6898]

ORG: None

TITLE: "The Low Frequency Parasitic Oscillation and Voltage Ratio of Series-Parallel Connected Inverters"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese
Vol 6 No 3, Sep 79 pp 137-146

TEXT OF ENGLISH ABSTRACT: In this article the mechanism of causing the low frequency parasitic oscillation in the circuits of the medium frequency series-parallel connected SCR inverters is analyzed. The conditions of eliminating oscillation are proposed. On this basis appropriate voltage classification of the medium power and frequency SCR smelting furnaces supplied by industrial power systems are also discussed.

AUTHOR: WANG Jingjiao [3769 2417 6030]
GAO Shantan [7559 3790 1098]

ORG: Both of the Data Processing Group

TITLE: "Design of a Mini Data Processing System"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese
Vol 6 No 3, Sep 79 pp 147-157

TEXT OF ENGLISH ABSTRACT: This paper introduces an automatic data processing system to deal with the freight charges of luggage and packages and discusses how to solve the following problems encountered in the design of this system: data structure and algorithm, distribution of functions between the hardware and software, improvement of reliability and simplification of the operation of the system.

9717
CS0: 4009

AUTHOR: FANG Ainong [2455 1947 6593]

ORG: None

TITLE: "On the Differentiability and the Existence Theorem of a Solution to the Problem of Oblique Derivative"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese Vol 6 No 4, Dec 79 pp 1-13

TEXT OF ENGLISH ABSTRACT: We give the existence and uniqueness theorems of a generalized solution to the problem of oblique derivative for a non-linear system (A)

$$w_z^- = g(z, w, w_z), \quad |z| < 1,$$

$$|g(z, w, w_z^1) - g(z, w, w_z^2)| \leq q_0 |w_z^1 - w_z^2|, \quad q_0 = \text{const} < 1,$$

in Sobolev's space $w_p^{(1)}$. We give the existence and uniqueness theorems of a generalized solution and a continuous differentiable solution, and also spectral theory and differentiability of a generalized solution for the problem of oblique derivative of linear system (A)

[Continuation of HUNAN DAXUE XUEBAO Vol 6 No 4, Dec 79 pp 1-13]

$$w_z^- = q_1(z)w_z + q_2(z)\bar{w}_z + A(z)w + B(z)\bar{w} + c(z),$$

$$|q_1(z)| + |q_2(z)| \leq \text{const} < 1.$$

AUTHOR: CHEN Qiang [7115 1730]

ORG: None

TITLE: "A Method of Comparative Decision of Stability of Functional Differential Equations"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese Vol 6 No 4, Dec 79 pp 14-21

TEXT OF ENGLISH ABSTRACT: In this paper, we transform the problem of stability of functional differential equations into a problem of stability decision of ordinary differential equations by using Liapunov functionals. We obtain some sufficient conditions of asymptotic stability and uniform asymptotic stability for functional differential equations which have been discussed by Li and Hale. The results of this paper can be adapted to a wide range and can extend the corresponding stability theorems in Hale and theorem 1 in Jin.

AUTHOR: WEN Lizi [3306 4539 1807]

ORG: None

TITLE: "The Extension of Mean Convergence and Its Necessary and Sufficient Conditions"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese Vol 6 No 4, Dec 79 pp 22-36

TEXT OF ENGLISH ABSTRACT: In this paper, we extend the concept of the mean convergence in L_p spaces so that it can include the concepts of the mean convergence in Orlicz spaces and spaces of ϕ -integrable functions and give several necessary and sufficient conditions of the mean convergence. These conditions are also the necessary and sufficient conditions of the strongly modular convergence and the normed convergence. In particular, these are the necessary and sufficient conditions of the mean convergence and the normed convergence in L_p spaces and Orlicz spaces. Theorem 3 and theorem 4 are the extensions of the famous Vitali theorem and Lebesgue theorem.

AUTHOR: WANG Yimun [3769 6318 5549]
WANG Kecheng [3769 0668 2052]
HE Taiqiong [6320 0669 8825]

ORG: WANG Kecheng and HE both of Hunan Institute of Computation

TITLE: "Displacements of an Elastic Half-Space under the Action of a Harmonic Concentrated Force"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese
Vol 6 No 4, Dec 79 pp 37-52

TEXT OF ENGLISH ABSTRACT: The integral-form solutions of the surface displacements of an elastic half-space produced by a horizontal harmonic concentrated force are obtained from the Laplace transform of displacements for Dirac delta $\delta(t)$ pulse force. In contrast to Lamb's solution of integral expression, the authors use Heaviside harmonic step function $H(t)e^{i\omega t}$ and obtained the exact and closed-form solutions for the dynamic horizontal surface displacements of a homogeneous isotropic elastic half-space under a horizontal harmonic concentrated force. The exact solutions for the dynamic harmonic concentrated force are matched with the well-known Cerruti's solution in statics and with Chao's solution in dynamics. The results of the exact and closed-form solutions are illustrated in graphs and are compared with Toriumi's theoretical results.

AUTHOR: ZHOU Guanglong [0719 0342 7893]

ORG: None

TITLE: "The Determination of the Equivalent Vertical Spring Constant of Layered Subsoil"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese
Vol 6 No 4, Dec 79 pp 53-65

TEXT OF ENGLISH ABSTRACT: This paper presents a method of determining the equivalent vertical spring constant of layered subsoil. The derivation is based on an elasticity formula in succinct form, so that both accuracy and simplicity are secured. An accessory chart is provided for further labor saving. In principle, this method may also be used to deal with the equivalent Winkler's modulus or Young's modulus of layered media for the calculation of beams on elastic foundations.

AUTHOR: Yan Yifan [7346 0001 0416]

ORG: None

TITLE: "The Amorphous Semiconductor Silicon p-n Junction"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese
Vol 6 No 4, Dec 79 pp 66-74

TEXT OF ENGLISH ABSTRACT: Early in 1976, W. E. Spear et al., prepared an all-amorphous silicon (a-si) p-n junction. In this article the writer attempts to establish a corresponding static theory of the a-si p-n junction. Assuming that the analytic form of the distribution function of gap states density is still unknown, applying the integral mean-value theorem and properly supposing the characteristic of the energy band of the p-n junction, an equation is finally deduced as expected. It shows that in light doping, the expression about electrostatic potential of a-si p-n junction, mathematically, is the same as its counterpart in c-si for abrupt junction except for one factor.

AUTHOR: HUANG Baixian [7806 0130 6343]

ORG: None

TITLE: "Time Constant Regulator"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese
Vol 6 No 4, Dec 79 pp 75-92

TEXT OF ENGLISH ABSTRACT: The Time Constant Regulator is used to change the time constant of R-L, R-C or R-L-C electric circuits.

In this paper the principle of construction of the Time Constant Regulator, the electric circuits and the result of experimentation are discussed.

AUTHOR: ZHAO Changjiu [6392 1603 1432]
ZHANG Shuling [1728 3219 3781]
ZENG Lingnan [2582 0407 0005]
SUN Xiaoyun [1327 2556 0061]

ORG: None

TITLE: "The Study of Selecting Inhibitors in Sulfuric Acid Solutions"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese
Vol 6 No 4, Dec 79 pp 93-104

TEXT OF ENGLISH ABSTRACT: This paper describes some consequences of selecting inhibitors in sulfuric acid solutions by using the methods of linear polarization technique and potentiodynamic polarization. It is much easier and faster to select the inhibitors and evaluate their inhibition efficiencies by the above electrochemical methods. It is also more convenient to study the effects of different corrosion factors.

By making use of the above methods some more efficient inhibitors have been selected in the sulfuric acid solutions.

AUTHOR: CHEN Changju [7115 2490 5112]

ORG: None

TITLE: "The Restrictive Condition in Applying the Principle of Moment of Momentum to the Instantaneous Center of a Body in Plane Motion"

SOURCE: Changsha HUNAN DAXUE XUEBAO [JOURNAL OF HUNAN UNIVERSITY] in Chinese
Vol 6 No 4, Dec 79 pp 105-108

TEXT OF ENGLISH ABSTRACT: It is proved in this paper that the principle of moment of momentum for a rigid body with respect to its instantaneous center P has a simple formula $J_P \dot{\theta} = \sum m_p(F)$, if a constant distance is kept between the instantaneous center of rotation and the centroid of this body in plane motion. This method is rather convenient for practical application. In addition, the rationality of the proofs on this topic made by A. I. Nekrasov and by the Teaching and Research Group of Mechanics of Zhongshan University is discussed.

9717

CSO: 4009

Scientific Instruments

AUTHOR: HUA Zhongyi [5478 0022 0001]
ZHUGE Jian [6175 5514 0256]
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CHEN Huaxian [7115 5478 0103]
HUANG Jinlin [7806 6855 2651]

ORG: None

TITLE: "A Soft X-ray Appearance Potential Spectrometer with a Sealed-off Analyzer Tube"

SOURCE: Beijing YIQI YIBIAO XUEBAO [CHINESE JOURNAL OF SCIENTIFIC INSTRUMENTS]
in Chinese No 1, Feb 80 pp 2-11

TEXT OF ENGLISH ABSTRACT: The soft X-ray appearance potential spectroscopy (SXAPS) is a useful technique for surface analysis. The method is based on the fact that as the surface of a solid is bombarded by an electron beam, the soft X-ray fluorescence of this material as a function of the incident electron energy exhibits abrupt changes at the appearance potentials of characteristic X-rays. The main information contained in these appearance potential peaks

[Continuation of YIQI YIBIAO XUEBAO No 1, Feb 80 pp 2-11]

reveals the binding energies of core electrons and the density of unfilled valence states.

A complete set of SXAPS equipment, including a UHV system, a sealed-off analyzer tube, a monofrequency lock-in amplifier and other electronics, is made for surface physical investigations. The sealed-off tube is simple and extremely necessary for the comparative study of some solid surfaces under different treatments or aging. Typical results are given for the surface analyses of pure metal, semiconductor and alloys.

AUTHOR: ZHAO Fuzhen [6392 1788 4176]
ZHANG Gongming [1728 0501 6900]

ORG: None

TITLE: "A New Device for Strain Gauge Calibration"

SOURCE: Beijing YIQI YIBIAO XUEBAO [CHINESE JOURNAL OF SCIENTIFIC INSTRUMENTS]
in Chinese No 1, Feb 80 pp 12-20

TEXT OF ENGLISH ABSTRACT: This paper introduces a new principle of design for strain gauge calibration and offers a new calibrating set. The set is based on the theory of "inductive voltage divider-resistor matching network" as a standard radio network. This special network is highly accurate and steady (2×10^{-4} , an order higher than the resistive standard and insensitive to temperature). The operating range is $400 \sim 20,000$ Hz and $100 \sim 20,000 \mu\epsilon$. It is available to calibrate strain gauges and analogy standard for it and other transducers.

AUTHOR: None

ORG: FFT Group, Institute of Acoustics, Chinese Academy of Sciences

TITLE: "FFT Real Time Signal Analyzer"

SOURCE: Beijing YIQI YIBIAO XUEBAO [CHINESE JOURNAL OF SCIENTIFIC INSTRUMENTS]
in Chinese No 1, Feb 80 pp 21-34

TEXT OF ENGLISH ABSTRACT: The FFT real time signal analyzer is a digital multi-functional signal analytical system. It can perform real time analysis of signals in the range of audio frequency, such as power spectrum, correlation, convolution, probability density, etc. It is based on base 2 Cooley-Tukey FFT algorithm and odd discrete Fourier transform. The system is constructed in a simple and sequential structure with a single arithmetic unit and single memory. The microprogram control and microdiagnostics are employed. This paper introduces the characteristics of the analyzer, the design principle and the hardware design of major components.

AUTHOR: JIANG Zhongxia [1203 0112 7209]

ORG: None

TITLE: "An Investigation on Ultrasonic Vortex Flowmeters"

SOURCE: Beijing YIQI YIBIAO XUEBAO [CHINESE JOURNAL OF SCIENTIFIC INSTRUMENTS]
in Chinese No 1, Feb 80 pp 35-44

TEXT OF ENGLISH ABSTRACT: This paper introduces a new vortex flowmeter using ultrasonic technology. It describes the characteristics and operating principle of the flowmeter. A brief discussion concerning the characteristics and optimal width of three types of basic vortex generators is given.

AUTHOR: CHE Jun [6508 6511]

ORG: None

TITLE: "An Investigation of Diffused Silicon Pressure Transducer and Its Technology"

SOURCE: Beijing YIQI YIBIAO XUEBAO [CHINESE JOURNAL OF SCIENTIFIC INSTRUMENTS]
in Chinese No 1, Feb 80 pp 45-56

TEXT OF ENGLISH ABSTRACT: The diffused silicon pressure transducer is a new detective meter which appeared in the 70's. This paper gives a description of the transducer's characteristics, principle and design theory of the silicon pressure diaphragm in detail. It introduces the investigations for calculating method of measuring range, diffusion technology, seal of cryogenic glass and spherical welding, etc. Accuracy of the transducer is 0.1% FS, and its non-linearity is within 0.05%.

AUTHOR: HUANG Junqin [7806 0193 2953]

ORG: None

TITLE: "Step-Line-Method of Determining Frequency Response from Transient Response"

SOURCE: Beijing YIQI YIBIAO XUEBAO [CHINESE JOURNAL OF SCIENTIFIC INSTRUMENTS]
in Chinese No 1, Feb 80 pp 57-63

TEXT OF ENGLISH ABSTRACT: The step-line-method of determining frequency response from transient response has been established in a previous article by the author. This method may only be used for transient response to either positive or negative unit step function and unit impulse function. This paper has established a more general step-line-method of determining frequency response from transient response which may be used for more general input signals, e.g., half sine waves, triangular waves, square waves, etc. The advantages of this method in comparison with Bowersox's and Carlson's methods are wider scope of application and simpler mathematical operations.

AUTHOR: MU Guoguang [3018 0948 0342]
YANG Jianji [2799 1696 1015]
FANG Zhiliang [2455 1807 5328]
CAO Qizhi [2580 0366 2535]
CHENG Lu [4453 6424]

ORG: None

TITLE: "The Optical Information Processing for a Spectrogram"

SOURCE: Beijing YIQI YIBIAO XUEBAO [CHINESE JOURNAL OF SCIENTIFIC INSTRUMENTS]
in Chinese No 1, Feb 80 pp 64-69

TEXT OF ENGLISH ABSTRACT: From the point of view of optical information processing, this paper considers the spectrogram obtained from a spectrophotometer a result of which was the real spectrum convolution with the instrument function. Therefore, by means of the deconvolution filter, the obtained spectrum is close to the real spectrum. This paper provides two examples computed by the FFT program.

AUTHOR: ZHANG Yimo [1728 0110 6206]
XU Guiying [1776 2710 5391]

ORG: None

TITLE: "The Application of an Afocal System in Measurements of 'Spatial Straightness'"

SOURCE: Beijing YIQI YIBIAO XUEBAO [CHINESE JOURNAL OF SCIENTIFIC INSTRUMENTS]
in Chinese No 1, Feb 80 pp 70-79

TEXT OF ENGLISH ABSTRACT: "Spatial Straightness" is usually measured with an internal focusing alignment telescope, but it cannot ensure the same accuracy for both far and near test points. This paper intends to solve the problem of similar measuring accuracy and imaging quality for both test points, that is, to provide similar magnification, aperture angle, theoretical resolution and illumination in the image plane, and to eliminate focusing errors and attain required imaging quality. In this paper an afocal system serves as the objective lens in the "Equi-accurate test system." For an illustration, a prototype instrument is developed.

AUTHOR: FANG Zongliang [2455 1350 5328]

ORG: None

TITLE: "Sonic Nozzle--A New Standard for Gas Flow Metrical Measurement"

SOURCE: Beijing YIQI YIBIAO XUEBAO [CHINESE JOURNAL OF SCIENTIFIC INSTRUMENTS]
in Chinese No 1, Feb 80 pp 80-88

TEXT OF ENGLISH ABSTRACT: This paper introduces a principle of a new standard for gas flow metrical measurement. It is based on the application of a sonic nozzle. The error analysis of the testing apparatus and the discharge coefficient of the sonic nozzle is carried out. Eight sets of nozzles have been calibrated, and their limit error is within $\pm 0.2\%$. The sonic nozzle is used to calibrate turbine flowmeters, root flowmeters, and density compensated orifice gas mass flowmeters. The linearity of the former two is better than $\pm 0.54\%$, and of the latter one is within $\pm 1.2\%$.

AUTHOR: QIAN Weizhang [6929 0251 7022]

ORG: None

TITLE: "Non-homogeneous Solutions of Slender Ring Shell Equations and Their Applications in Instrumental Design"

SOURCE: Beijing YIQI YIBIAO XUEBAO [CHINESE JOURNAL OF SCIENTIFIC INSTRUMENTS]
In Chinese No 1, Feb 80 pp 89-112

TEXT OF ENGLISH ABSTRACT: Non-homogeneous solutions of the slender ring-shell equation are applied to the problems of ring-shaped thermal expansion joint, slender ring-pipes under uniform internal pressure, and bending of slender curved pipes (like the Borden tube). The calculated results are compared to various experiments done in the past. The simple theory of slender-ring shell is shown to be useful for all these engineering computations. The related design formulas are also given in this paper.

AUTHOR: TAN Zugen [6223 4371 2704]
CHEN Shouchuan [7115 1343 1557]

ORG: None

TITLE: "The Fundamental Analysis and Selection Parameters of Eddy Current Transducers"

SOURCE: Beijing YIQI YIBIAO XUEBAO [CHINESE JOURNAL OF SCIENTIFIC INSTRUMENTS]
In Chinese No 1, Feb 80 pp 113-122

TEXT OF ENGLISH ABSTRACT: This paper discusses the fundamentals of eddy current transducers. The input may be transformed into three different types of parameters. They are: Q value, equivalent impedance Z and equivalent inductance L . The corresponding transducers are compared. The effects of coil parameters on the linear range and sensitivities are also given in this paper.

AUTHOR: DAI Yisong [2071 6654 2646]

ORG: None

TITLE: "Low Noise Electronic Design of Testing Instruments"

SOURCE: Beijing YIQI YIBIAO XUEBAO [CHINESE JOURNAL OF SCIENTIFIC INSTRUMENTS]
in Chinese No 1, Feb 80 pp 123-134

TEXT OF ENGLISH ABSTRACT: This paper introduces low noise circuit design formulae for different stages of correlating preamplifier and principle of low noise electronic design derived from the input equivalent algorithm of noise source and E_n-I_n model of noise parts. It also analyzes the noise properties of various precircuits (including feedback networks).

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TITLE: "Analytical Solution and Engineering Application of Dynamic Response for Long Gas Pipeline"

SOURCE: Beijing YIQI YIBIAO XUEBAO [CHINESE JOURNAL OF SCIENTIFIC INSTRUMENTS]
in Chinese No 2, May 80 pp 1-22

TEXT OF ENGLISH ABSTRACT: The long gas pipeline is a regulating object of distributing parameters. This paper gives a theoretical and analytical solution of the dynamic response for long gas pipeline in the form of infinite series with Bessel functions. By means of error analysis, some curves and graphs are simplified for engineering applications. With these curves and graphs, the designers may obtain the transfer functions of different inputs and outputs from basic parameters of gas pipeline conveniently. In order to reduce the calculations, a simple representation of grouping nonperiodic elements on the basis of fitting step transient response is also suggested with sufficient accuracy.

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TITLE: "Dead-time Unit and Its Compensative Control System"

SOURCE: Beijing YIQI YIBIAO XUEBAO [CHINESE JOURNAL OF SCIENTIFIC INSTRUMENTS]
in Chinese No 2, May 80 pp 23-32

TEXT OF ENGLISH ABSTRACT: The ratio of process equivalent dead-time to process equivalent capacity lag time, τ/T , is a determination of the control difficulty in industrial process control. The control difficulty increases with the ratio τ/T . When τ approaches or exceeds T , a common PID control is unavailable, so Smith's method of predictive compensation should be adopted. We have developed a model of the dead-time unit with the Pade approximation and the concept of decomposition and coordination of a large-scale system. Experiments have proved that the unit is valuable in industry. This paper describes the principles and features of the dead-time compensation in detail. A scheme of the dead-time unit is analyzed and parameters of its circuit are given. This paper includes the problems in application and its improvements.

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TITLE: "The Application of Feedforward-Feedback Control System in Large Digital Control Cutting Machine"

SOURCE: Beijing YIQI YIBIAO XUEBAO [CHINESE JOURNAL OF SCIENTIFIC INSTRUMENTS]
in Chinese No 2, May 80 pp 33-46

TEXT OF ENGLISH ABSTRACT: This paper introduces a construction of feedforward-feedback servo system based on the principle of invariability. It provides a schematic circuit of HPK-2 type cutting machine and makes a comparison between conventional synchro-servo system and feedforward-feedback control system with respect to the transient and steady-state performances. This paper describes the problem of steady-state error due to a ramp input also.

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TITLE: "A Nuclear Magnetism Resonance Magnetometer for Wide and High Field Density"

SOURCE: Beijing YIQI YIBIAO XUEBAO [CHINESE JOURNAL OF SCIENTIFIC INSTRUMENTS]
in Chinese No 2, May 80 pp 47-56

TEXT OF ENGLISH ABSTRACT: This paper describes a nuclear magnetism resonance magnetometer for wide range and high field density. It introduces the principle, construction, experimental method and results. Due to the adoption of varactor on the oscillator, electrical tuning is carried out. The achievement of high sensitivity and expanding of measuring range is caused by the adoption of transistors and amplifiers of low noise and low frequency. Thus the magnetometer may operate steadily and reliably.

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TITLE: "Extremely High Vacuum Ionization Gauge"

SOURCE: Beijing YIQI YIBIAO XUEBAO [CHINESE JOURNAL OF SCIENTIFIC INSTRUMENTS]
in Chinese No 2, May 80 pp 57-65

TEXT OF ENGLISH ABSTRACT: Three types of ion gauges with tube electron multiplier are developed, with the intention of solving the low pressure measurements up to 10^{-14} torr. The application of that new multiplier in extremely high vacuum measurements provides the possibility to solve the measuring problem of $10^{-13} \sim 10^{-15}$ torr.

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TITLE: "The Application of Pulse He-Ne Laser for High Speed Interference Photography"

SOURCE: Beijing YIQI YIBIAO XUEBAO [CHINESE JOURNAL OF SCIENTIFIC INSTRUMENTS]
in Chinese No 2, May 80 pp 66-71

TEXT OF ENGLISH ABSTRACT: In high speed interference photography, the characteristics of the He-Ne laser output and input current are adopted to transform a CW He-Ne laser into a controllable pulse source. The problem of synchronization for high speed camera, pulsed CO₂ laser and He-Ne pulse source is solved successfully in the studying of the interaction of the laser with matter.

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TITLE: "The Evaluation of Image Quality and Straight Edge Diffraction in Optical and Electronic Microscopes"

SOURCE: Beijing YIQI YIBIAO XUEBAO [CHINESE JOURNAL OF SCIENTIFIC INSTRUMENTS]
in Chinese No 2, May 80 pp 72-80

TEXT OF ENGLISH ABSTRACT: This paper deals with the evaluation of image quality and straight edge diffraction in optical and electronic microscopes, and the method for quantitative measurement under partially coherent conditions. The corresponding experimental device, physical model and calculated results are also described.

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TITLE: "A Device for Identification of Handwritten Numerals"

SOURCE: Beijing YIQI YIBIAO XUEBAO [CHINESE JOURNAL OF SCIENTIFIC INSTRUMENTS] in Chinese No 2, May 80 pp 81-88

TEXT OF ENGLISH ABSTRACT: This article presents a method by which handwritten Arabic figures 0-9 can be recognized. The Flying-Spot-Scanning technique adopted is used to follow the contour of the characters and obtain analogical information. Every character is divided into 4x5 zones and 8 moving directions. Therefore it is expressed in 17 primitive informations. In accordance with these, 60 features (e.g., arc, line, etc.) exist, and the combination of these 60 features can recognize Arabic figures 0-9 perfectly.

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TITLE: "The Estimation of the Dynamic Error of Measuring Instruments"

SOURCE: Beijing YIQI YIBIAO XUEBAO [CHINESE JOURNAL OF SCIENTIFIC INSTRUMENTS] in Chinese No 2, May 80 pp 89-96

TEXT OF ENGLISH ABSTRACT: This paper proposes to estimate the dynamic error of measuring instruments on the basis of its theory of dynamic performance. The bias errors, repeatability errors and inaccuracies of the instruments for measuring geometrical or mechanical quantities are used to estimate the dynamic error. This paper provides a calculating method and examples. The method is also available for other automatic instruments.

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TITLE: "A Synthetic Method for Systematic Uniformly Distributed Uncertainties"

SOURCE: Beijing YIQI YIBIAO XUEBAO [CHINESE JOURNAL OF SCIENTIFIC INSTRUMENTS]
in Chinese No 2, May 80 pp 97-107

TEXT OF ENGLISH ABSTRACT: This paper introduces an approximate formula for combination of n partial systematic uncertainties on the assumption of uniform distribution. If $\delta_{ns} e_i \leq |e_i|_{\min}$ is satisfied, the given formula would be established.

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TITLE: "A Phase Sensitive Detector"

SOURCE: Beijing YIQI YIBIAO XUEBAO [CHINESE JOURNAL OF SCIENTIFIC INSTRUMENTS]
in Chinese No 2, May 80 pp 108-115

TEXT OF ENGLISH ABSTRACT: Recently the variety and complexity of a phase sensitive detector (PSD) increased significantly. Selection of the PSD for application requires a clear understanding of the different circuits of PSD available, their operation, advantages and disadvantages. This article discusses different circuits of PSD and their principles and applications.

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